1982 MISHAP AND INJURY DATA

FOREWORD

This report contains statistical and narrative information concerning NASA and NASA Contractor mishap and injury experience for calendar year 1982. Injury data are reported for full-time NASA civil servants, and some injury data in the form of NASA form 345's and injury briefs were submitted for many contractors at the installations. Accurate injury/illness frequency and severity rate data are not available from some contractors. Quarterly reports have been requested covering our contractors in much the same way they cover our government employees. This report is designed to assist management at all levels in determining areas for concentration of resources and to advise employees of the status of the NASA safety and health programs.

Our lost time injury/illness frequency rate remained at 0.47 per 200,000 hours worked. Four installations had decreases in their lost time injury/illness frequency rates, and three had decreases in total reportable rates. The NASA severity rate continued to decline and is at its lowest point since 1970. The chargeback billing which the Office of Workers' Compensation Program imposes on NASA for reimbursement increased to $4.8 million, but costs associated with continuation of pay continued to decline since reaching a peak in 1978, now at $94,294.

An analysis of our lost time injuries over the last four years indicates that the majority of our accidents are still those normally associated with industrial operations and are not unique to a research organization. This indicates a need to continue to direct emphasis to the occupational safety and health portions of the overall program. Also, efforts will be directed toward making improvements in the aviation safety program and accident investigation procedures. The 1983 targets established for each installation in accident prevention are designed to focus attention on occupational safety and health, major mishaps, monetary losses, and recertification of pressure vessels/systems.

The number of fire incidents was nine in 1982, and the costs decreased from $800,000 to $75,400. Our aviation flight operations experienced two significant losses costing $1.185 million, the death of one pilot and the loss of one aircraft and significant damage to a second aircraft. We also had an aircraft maintenance mishap which cost $175,000. The automotive accident frequency rate decreased, but the monetary losses increased in 1982 compared to 1981. The losses were still low compared to several recent years. Our frequency rate for government vehicles was 3.80 accidents per million miles driven and 0.81 for private vehicles used for official business. The reported losses were $15,011 for government vehicles. This is the third time since 1971 that NASA has been within the target of 5.0 accidents per 1,000,000 miles driven for the motor vehicle rate.

The NASA Safety and Health programs have shown improvement in the last few years, and they are expected to continue to improve in the future. The programs compare very favorably to other Federal agencies and private industry. We commend you for your excellent performance during the past year and encourage you to develop new initiatives in the area of aviation safety in 1983.

J. Larry Crawford
Director of Safety
NASA Headquarters

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NASA PERSONNEL INJURIES FOR 1982

NASA had a 4% decrease in lost time injuries/illnesses in 1982; however, the rate per hour worked remained the same as for 1981. Three charts compare injury rates (pp.2, 3, and 4): LOST TIME CASES IN FEDERAL AGENCIES - 1981; LOST-TIME INJURY RATES--PRIVATE SECTOR--FEDERAL AGENCIES--NASA--SELECTED INDUSTRY; and INJURY RATES: PRIVATE--FEDERAL GOV'T--NASA--SELECTED INDUSTRY, and on page 5, a chart compares NASA rates since 1974. The LOST TIME CASES IN FEDERAL AGENCIES - 1981 have small decreases for several agencies and for All Government as compared to the 1980 data; however, there were several agencies with increases. The rates shown on the charts for INDUSTRY were obtained from the Bureau of Labor Statistics and are one year late for our reports, but they indicate NASA's comparison with other agencies. The charts will be updated when the data becomes available. Although the NASA lost time injury rate increased steadily from 1969 (not included on charts) until 1977 before it began to decrease, the total injury rate has decreased dramatically (see p. 5). However, the steady decline in Total Injury Rate ended in 1982, and this indicator bears watching.

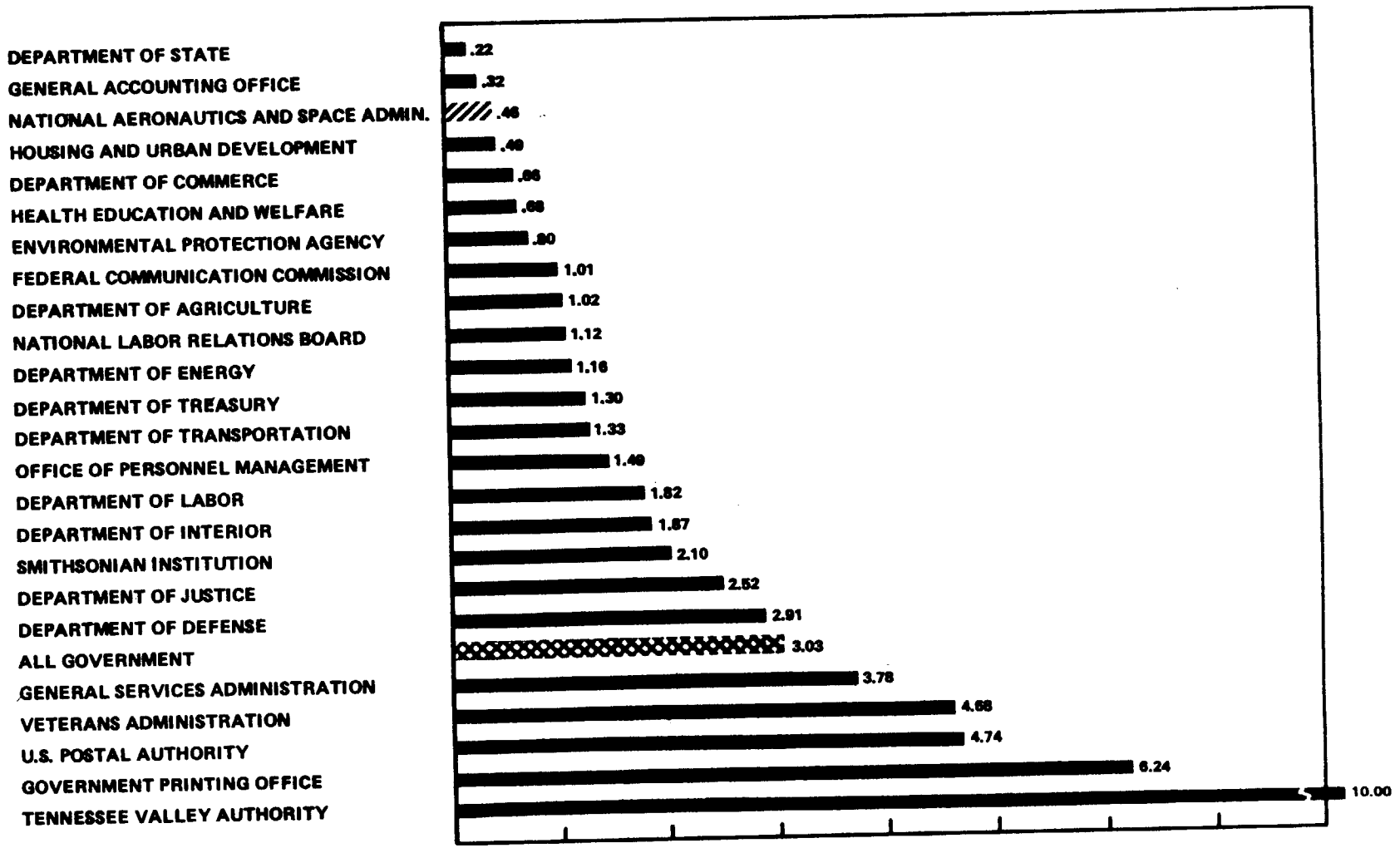
The NASA lost time injury/illness frequency rate went down from 0.82 in 1977 to 0.47 in 1981 and 1982. In 1982, there were six NASA installations which were better than the agency rate of 0.47. ARC's rate of 0.13 was the lowest for the large installations (NSTL had no lost-time injury/illness) followed by MSFC with 0.19. On page 6, one can see that the following installations reduced their lost time rates during 1982: ARC, LeRC, MSFC, and NSTL. NSTL made the largest decrease in lost time frequency rate by reducing their rate from 2.46 (3 incidents) to 0.0 (100%) and ARC followed with a reduction of 0.75 or 90%. Pages 7 thru 9 are comparisons of Lost Time Injuries/Illnesses vs Time, and pages 10 and 11 compare severity rates. The cost of accidents and injuries is graphically shown on pages 13 thru 16.

All centers submitted Form 345's (Accident Cause Analysis Reports, pp. 17 and 18) for Federal Employees. The lost time cases indicated here differ by 11 percent from those reported on the Form 102F's (Federal Occupational Injuries and Illness Survey). The total cases are significantly greater than those listed on the 102F's. This may indicate that some centers include first aid cases while others do not. All centers included 345's for contractors, pp. 19 and 20. Again there are some numbers that seem to be inconsistent; however, these apparent disagreements may be the result of how reportable cases and first aid cases are recorded.

A review of pages 43 to 54 will provide a good summary description of the types of injuries our employees are receiving. As in years past, the message from all of this is that while slips, trips, and falls will always be with us, top managers can and should exercise more direct supervision of day-by-day working conditions, fully investigate each injury, and take action to prevent recurrences and potential abuse of Continuation of Pay and Federal Employee Compensation procedures. Every effort should be made to drive the lost time rate toward the lower limits with the intent of returning to a rate of approximately 0.2 to 0.3 over the next several years.

Efforts for the coming year will concentrate on minimizing future accidents thru improved accident investigation procedures. Significant effort will also be devoted to improvements in our aviation safety program.

LOST TIME CASES IN FEDERAL AGENCIES - 1981
OCCUPATIONAL INJURY RATES FOR CIVILIAN PERSONNEL
PER 200,000 MAN-HOURS



NASA HQ DS83-2427(1)
6-20-83

Figure 1
2

LOST-TIME INJURY RATES: PRIVATE SECTOR-FEDERAL AGENCIES-NASA-SELECTED INDUSTRY

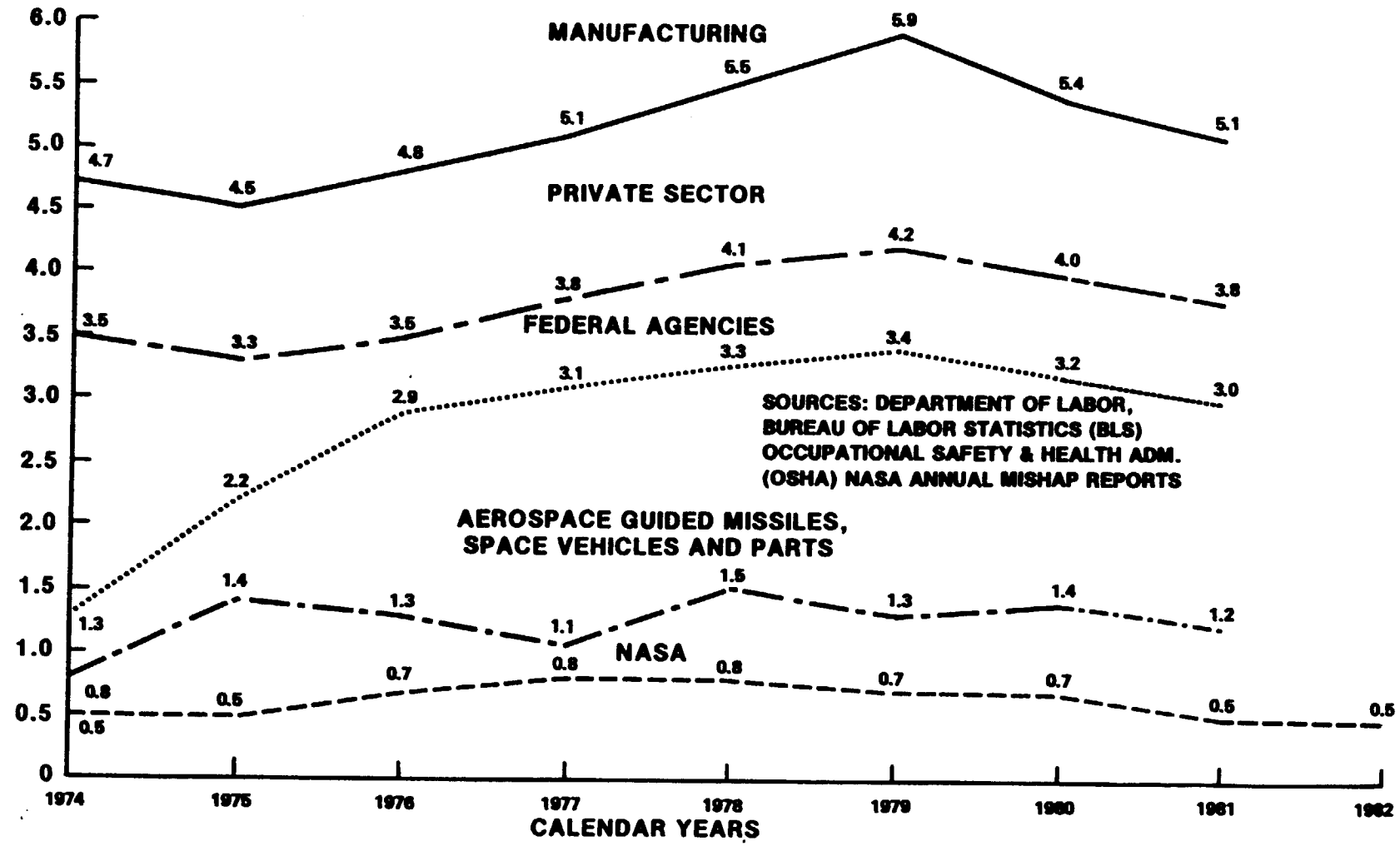
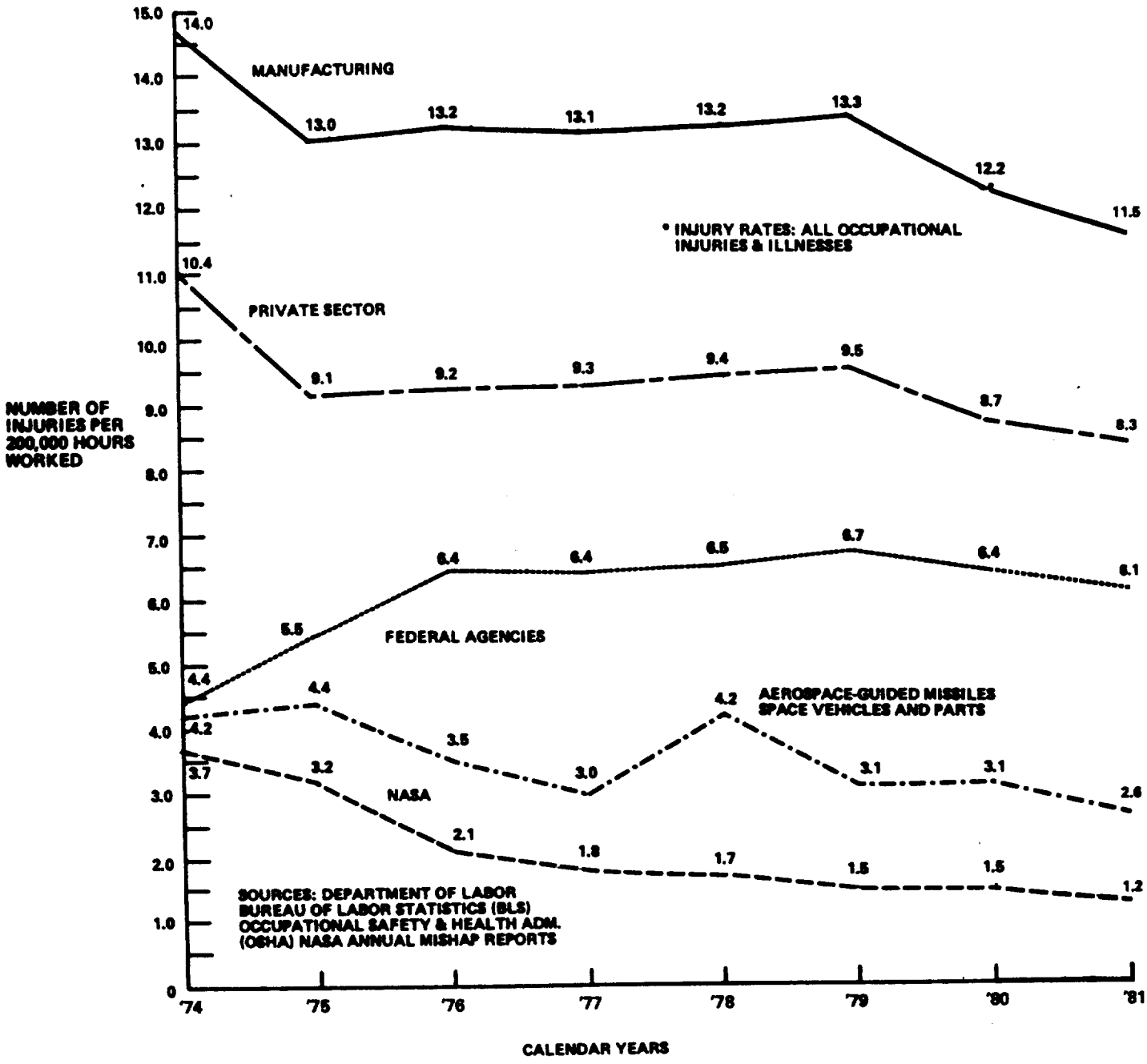


Figure 2

3

NASA HQ D883-33000 (1)
6-23-83

INJURY RATES:* PRIVATE SECTOR-FEDERAL AGENCIES-NASA-SELECTED INDUSTRY



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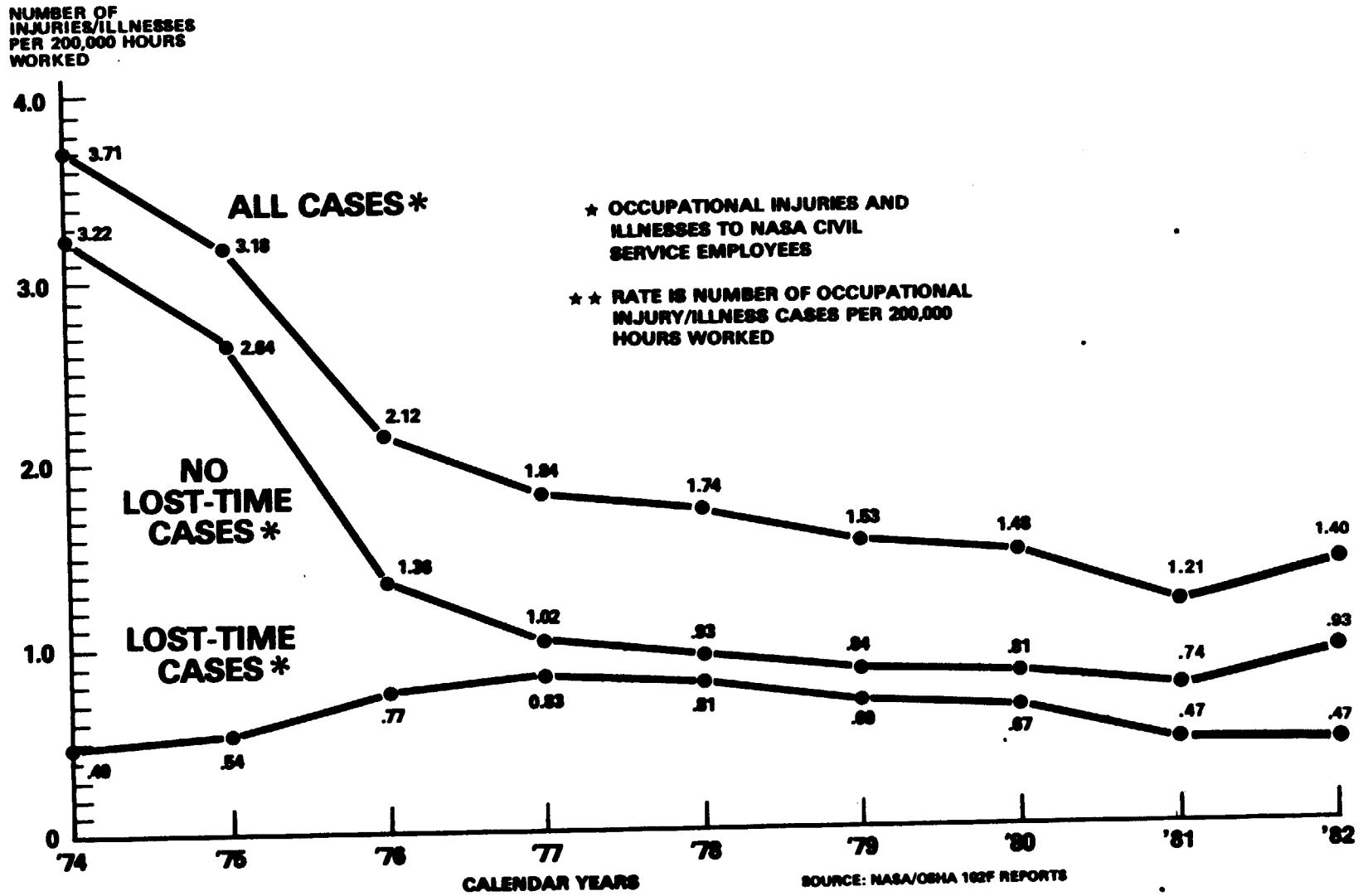
6-23-83

Figure 3

NASA OCCUPATIONAL INJURY/ILLNESS* RATES**
(1974-1982)



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7-8-83

Figure 4

NASA INJURY AND ILLNESS DATA BY INSTALLATION -- ANNUAL 1982 REV. 5/5/82

	NO. OF EMPLOYEES	HRS WORKED IN (K)	TOTAL INJURY/ ILLNESS DATA NO. CASES	FREQ. RATE 1981	FREQ. RATE 1982	LOST TIME INJURY/ILLNESS DATA NO. CASES	NO. DAYS	FREQ. RATE 1981	FREQ. RATE 1982	SEVERITY RATE	LOST TIME RATE OBJECTIVE FOR 1982 CUM RATE	LOST TIME RATE OBJECTIVE FOR 1982 TARGET RATE
ARC	2252	4,521	15	1.32	0.66	3	63	0.88	0.13	2.79	0.13	0.96
GSFC	3799	6,225	45	1.05	1.45	26	202	0.68	0.84	6.49	0.84	0.54
HQ	1656	2,997	37	1.75	2.47	16	106	0.58	1.07	7.07	1.07	0.50
JSC	3682	6,739	75	1.01	2.23	10	109	0.13	0.30	3.24	0.30	0.30
KSC	2249	4,644	12	0.46	0.52	8	196	0.34	0.34	8.44	0.34	0.43
LaRC	3006	5,307	32	1.54	1.21	12	42	0.32	0.45	1.58	0.45	0.49
LeRC	2780	5,035	58	2.23	2.30	18	108	0.74	0.71	4.29	0.71	0.84
MSFC	3317	6,188	19	0.50	0.61	6	55	0.31	0.19	1.78	0.19	0.30
NSTL	121	248	0	2.46	0	0	0	2.46	0	0	0	0.85
TOTAL	22,862	41,904	293	1.21	1.40	99	881	0.47	0.47	4.20	0.47	
LAST YEAR	23,360	44,008	267	1.21	--	103	1,453	0.47	--	7.54		

1. TOTAL INJURY/ILLNESS FREQUENCY RATE = NO. OF CASES PER 200,000 HOURS WORKED.
2. LOST TIME INJURY/ILLNESS FREQUENCY RATE = NO. OF LOST WORKDAY CASES PER 200,000 HOURS WORKED.
3. INJURY/ILLNESS SEVERITY RATE = NO. OF LOST WORKDAYS PER 200,000 HOURS WORKED.

Figure 5

NUMBER OF NASA EMPLOYEES AND NUMBER OF LOST TIME INJURIES VS TIME

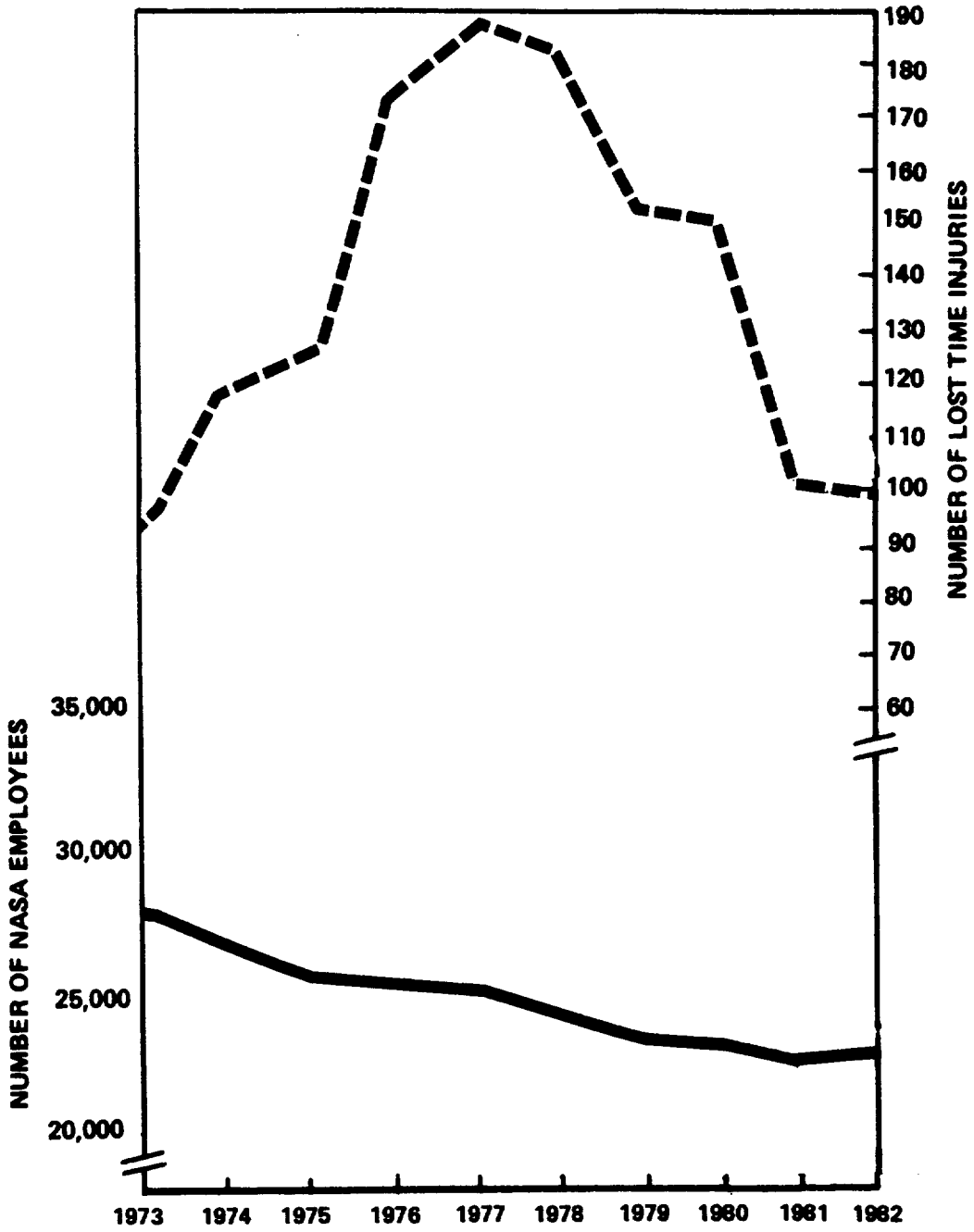


Figure 6

NASA HQ D683-2428 (1)
6-20-83

NASA LOST TIME INJURY/ILLNESS RATES - YEARLY AND QUARTERLY COMPARISON

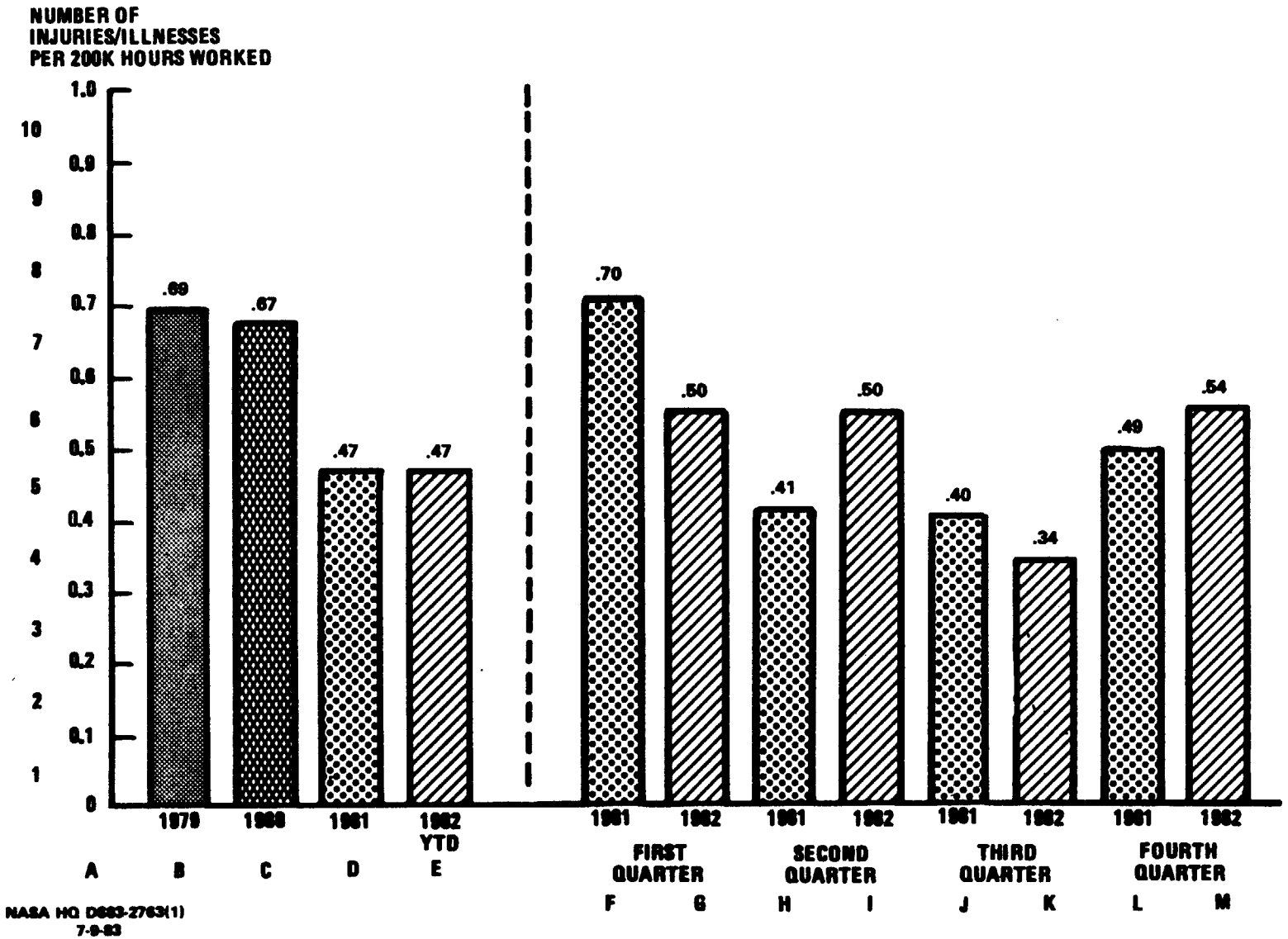
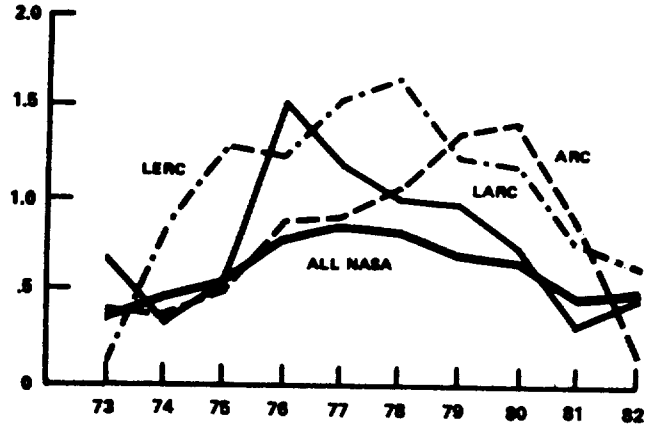


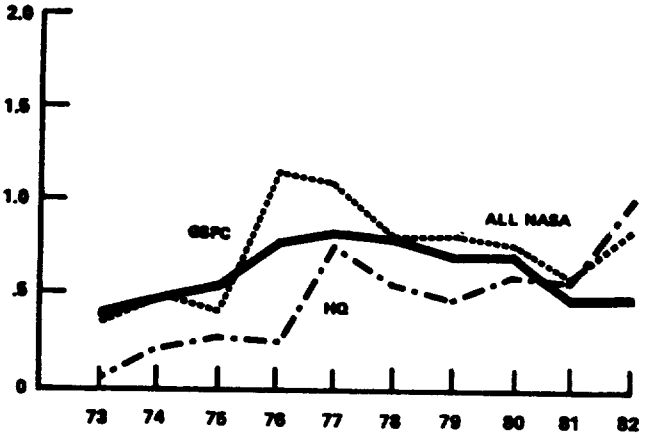
Figure 7

LOST TIME

INJURY FREQUENCY RATES

NUMBER OF INJURIES PER 200,000 HOURS WORKED





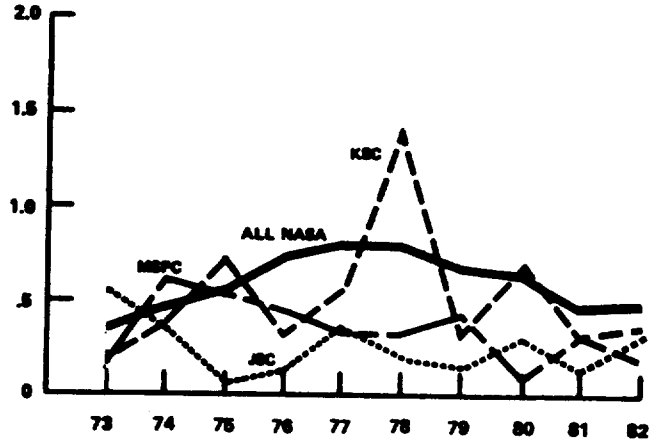
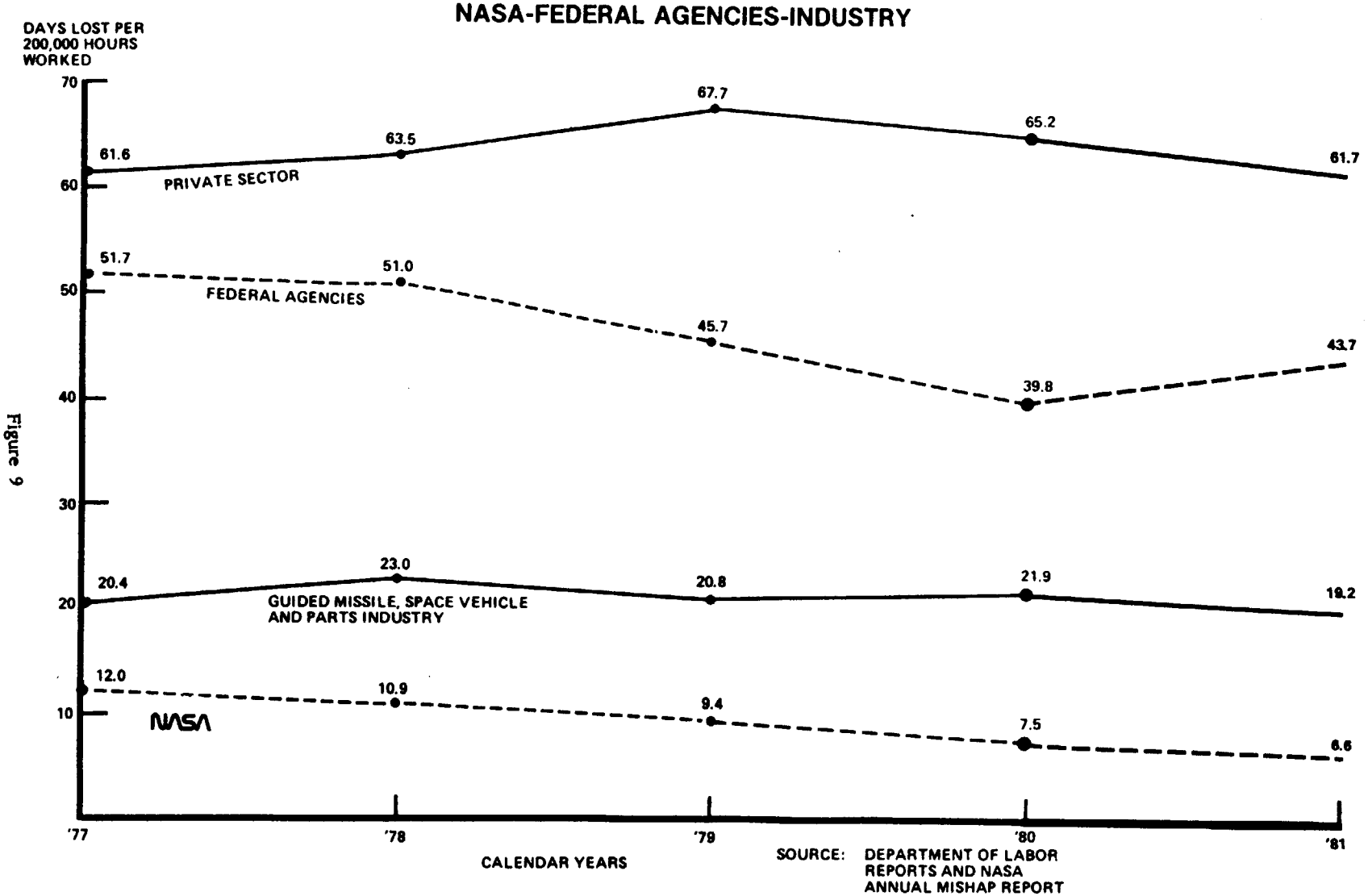


Figure 8

NASA HQ D883-2436(1)
6-20-83

OCCUPATIONAL INJURY/ILLNESS SEVERITY RATE
NASA-FEDERAL AGENCIES-INDUSTRY

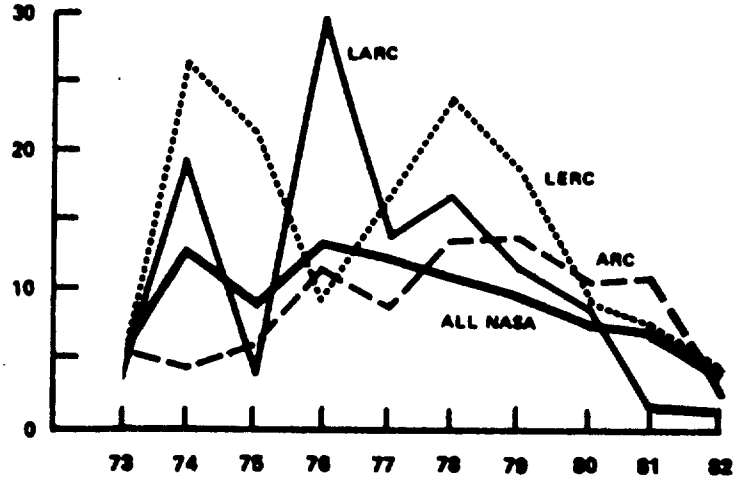


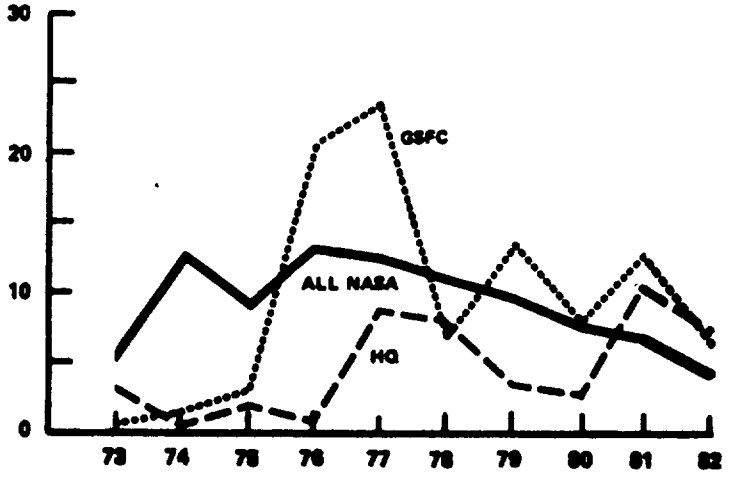
NASA HQ D883-2549 (1)
6-23-83

Figure 9

INJURY SEVERITY RATES

DAYS LOST PER 200,000 HOURS WORKED





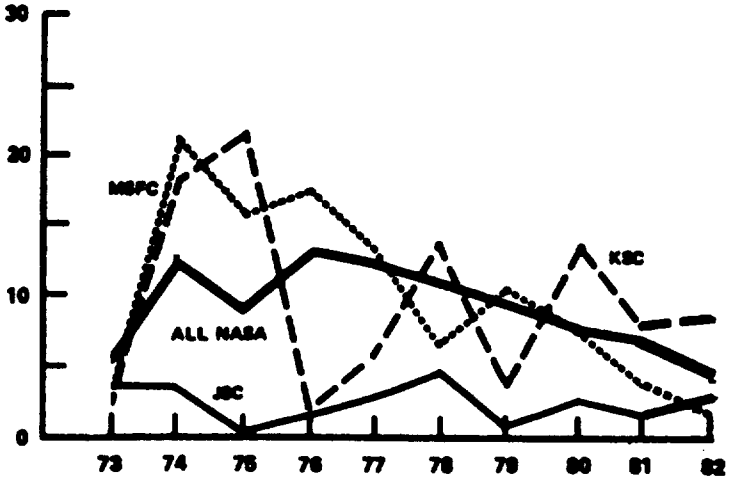


Figure 10

NASA HQ D683-3437(1)
6-20-83

NASA MISHAP DATA BY INSTALLATION -- ANNUAL 1982 REV.5/5/83

	AUTO MISHAP FREQ. RATE		AIRCRAFT MISHAPS		FIRE LOSSES		OTHER MISHAPS		TOTAL MISHAPS	
	GOV	POV	NO.	RATE	NO.	($K)	NO.	($K)	COST ($K)	RATE ($K)
ARC	1.84	0	2	42.04	3	0.90	7	10,637.26	10,823.92	2,393.89
GSFC	2.51	0.85	0	0	1	7.50	0	0	17.27	2.77
HQ	77.38	0	0		0	0	0	0	3.04	1.01
JSC	38.54	2.04	1	7.64	2	29.00	0	0	730.41	108.39
KSC	0.71	0	0	0	2	23.00	27	996.68	1,021.72	220.00
LaRC	0	0	0	0	0	0	2	1,500.00	1,500.00	282.63
LeRC	3.44	0	0	0	0	0	0	0	1.41	0.28
MSFC	2.99	4.70	0	0	1	15.00	0	0	22.38	3.62
NSTL	0	0	0	0	0	0	0	0	0	0
TOTAL	3.80	0.81	3	13.13	9	75.40	36	13,133.94	14,120.16	336.96
LAST YEAR	3.94	2.24	2	7.73	16	388.72	14	355.66	957.37	21.80

1. AIRCRAFT MISHAP FREQ. RATE = NO. OF MISHAPS PER 100,000 HOURS FLOWN.
2. MOTOR VEHICLE MISHAP FREQ. RATE = NO. OF MISHPAS PER MILLION MILES DRIVEN.
3. TOTAL COST OF MISHAPS INCLUDES REPARIRS/REPLACEMENTS OF MOTOR VEHICLES AND DAMAGE, AND TORT CLAIMS (AS ON OSHA FORM 102FF).
4. MISHAP COST RATE = TOTAL COST OF MISHAPS PER MILLION HOURS WORKED.

Figure 11

COST OF CY 1982 NASA ACCIDENTS/INCIDENTS/INJURIES

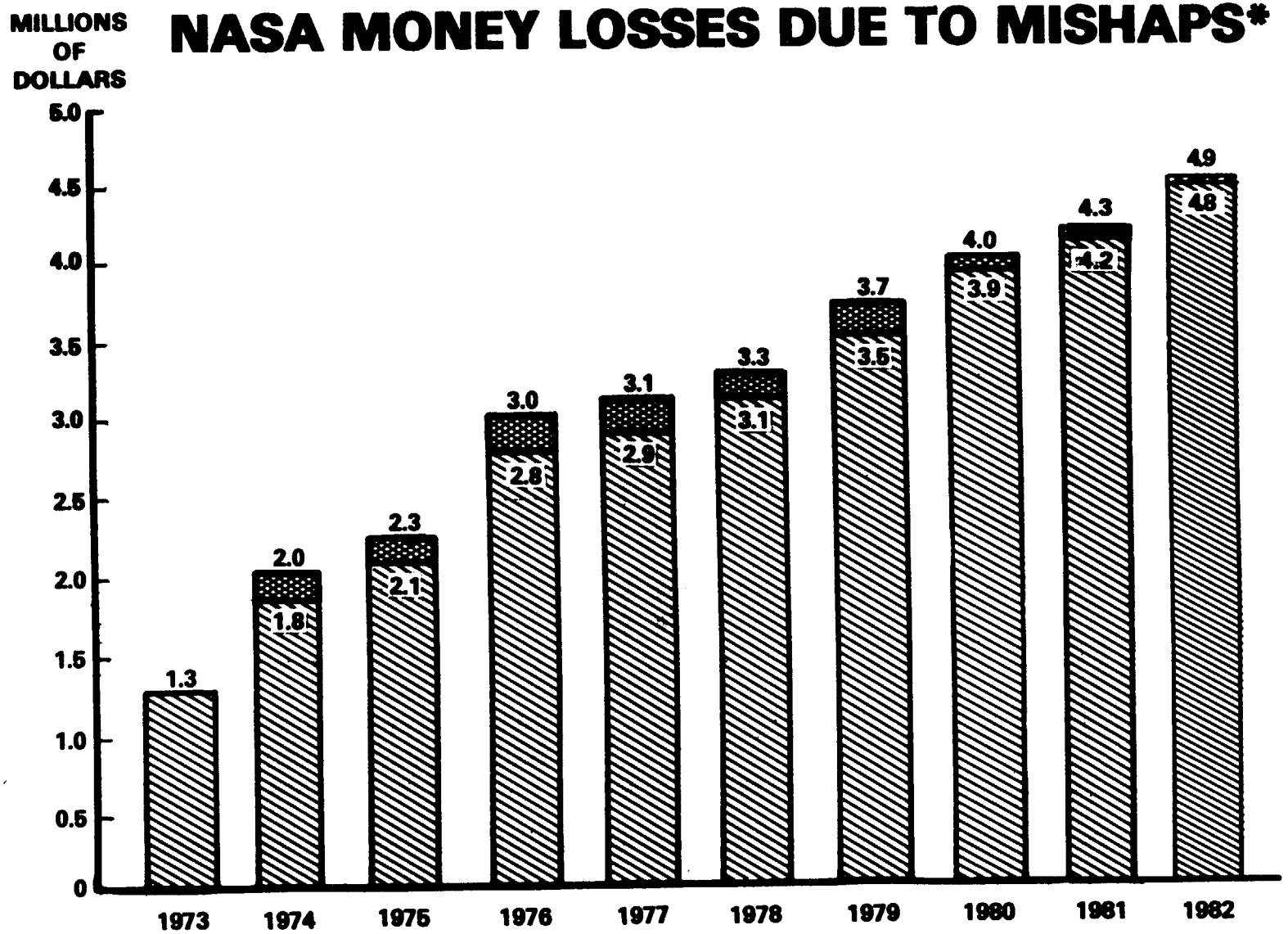
MANPOWER LOSS		1	FATALITIES
		194	NON-LOST WORKDAY INJURIES
		99	LOST WORKDAY INJURIES
		881	WORK DAYS LOST = 3.38 YEARS EFFORT

MONEY LOSS	WAGES	$ 94,294	
	(COP RELATED COSTS) CHARGE BACK BILLING TO FEDERAL EMPLOYEES COMPENSATION FUND (1982)	$ 4,837,871	
	SUB-TOTAL	$ 4,932,165	
			NO. OF MISHAPS
MATERIAL LOSS	AIRCRAFT	$ 1,390,000	4
	VEHICLES	17,300	39
	FIRE	75,400	9
	OTHER PROPERTY	13,133,900	36
	SUB-TOTAL	$ 14,616,600	88
TOTAL LOSS		$ 19,548,765	

DOES NOT INCLUDE CONTRACTOR DATA
DOES NOT INCLUDE FUTURE COSTS FOR THE INJURIES AND ILLNESSES;
SINCE THEY WILL BE PART OF THE ANNUAL CHARGEBACK BILLING
DOES NOT INCLUDE MISSION FAILURES
DOES NOT INCLUDE TEST OPERATIONS FAILURES

Figure 12
13

NASA MONEY LOSSES DUE TO MISHAPS*



*INCLUDES LOST WAGES AND CHARGE BACK BILLING TO THE FEDERAL EMPLOYEES COMPENSATION FUND, BUT DOES NOT INCLUDE CONTRACTOR LOSSES.

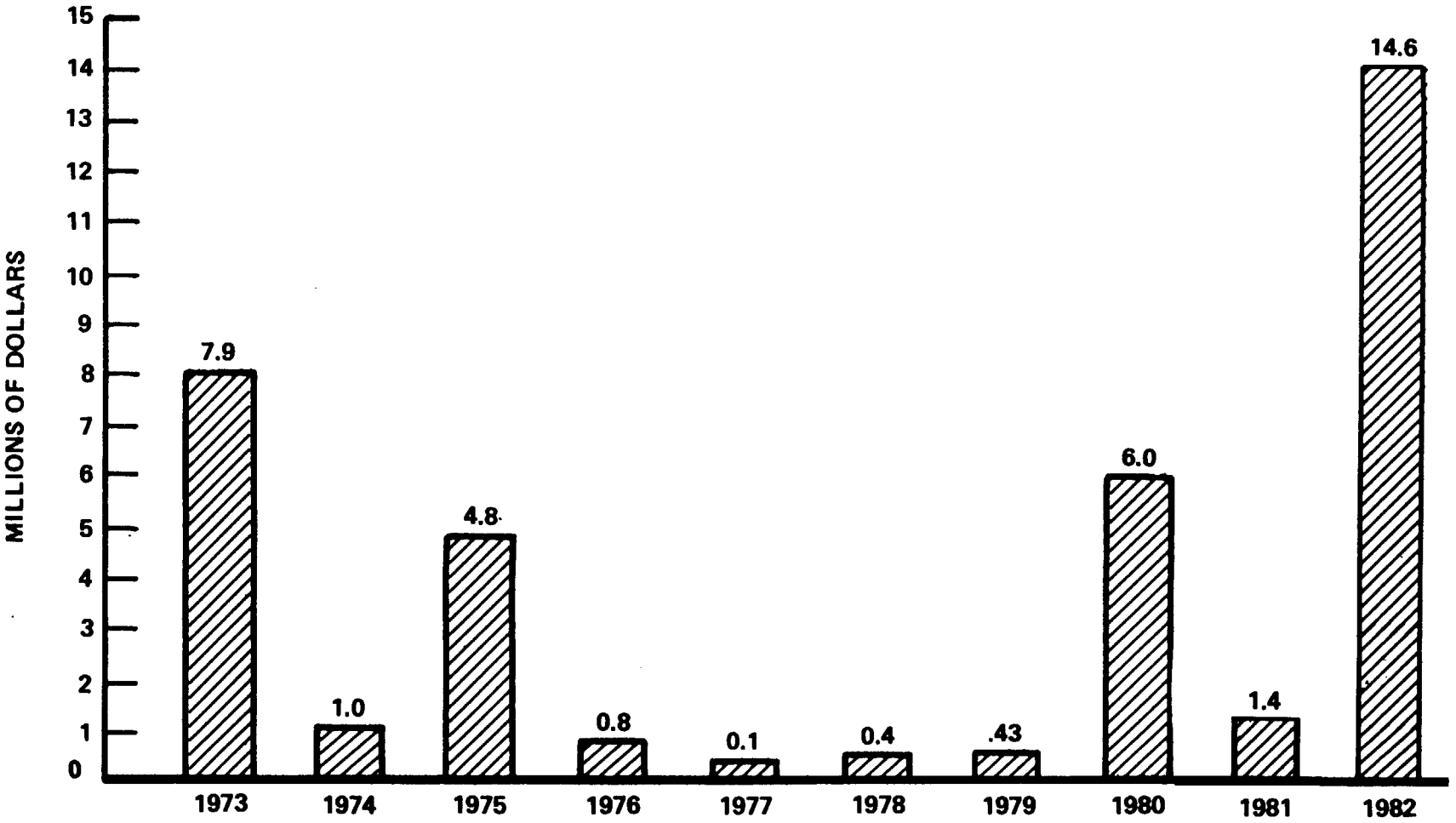
LOST WAGES

CHARGE BACK BILLING

NASA HQ D883-3435(1)
6-30-83

Figure 13

NASA MATERIAL LOSSES DUE TO MISHAPS *

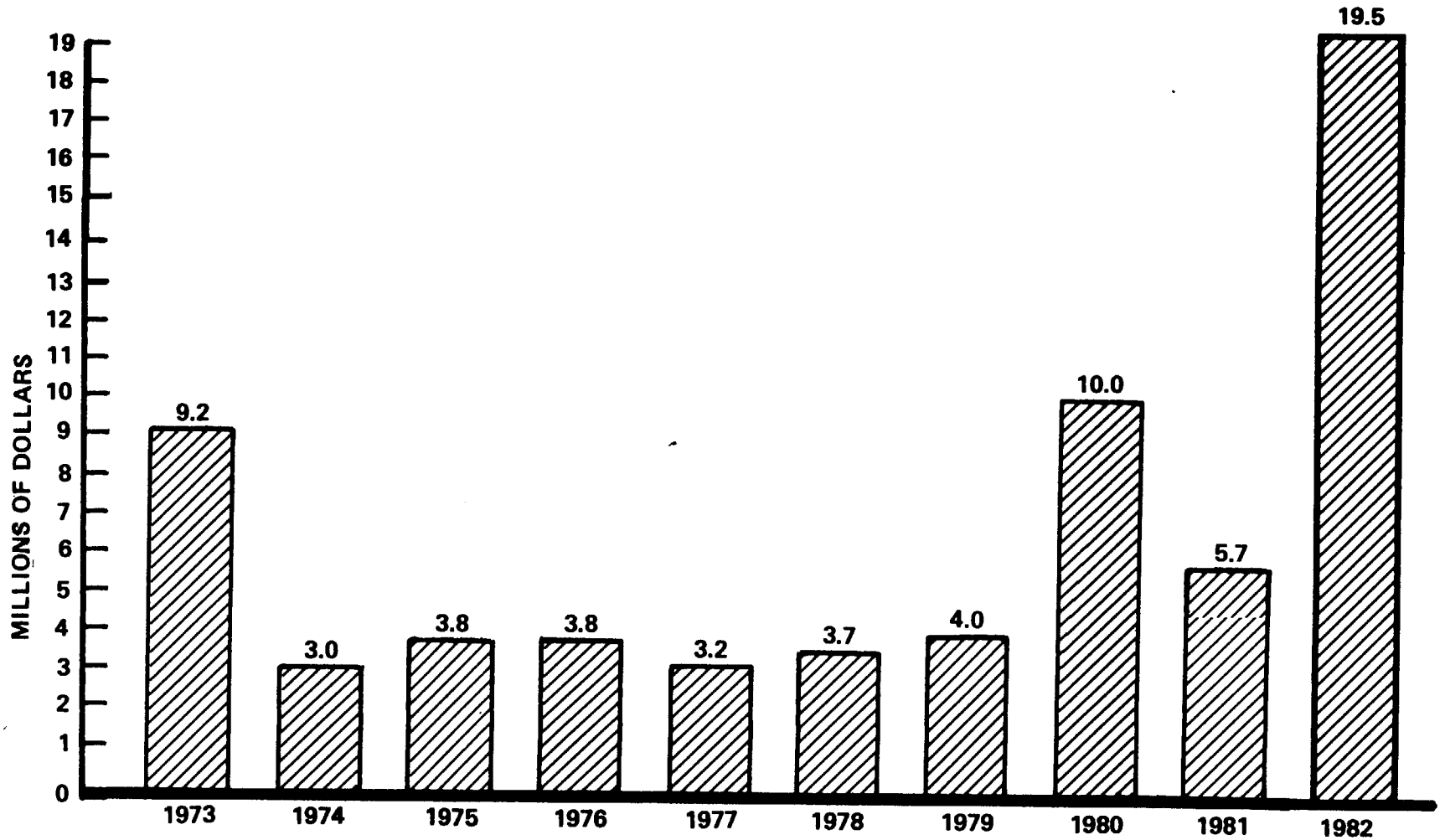


* INCLUDES AIRCRAFT, VEHICLE, AND FIRE MISHAPS AND LOSSES OF OTHER PROPERTY.
DOES NOT INCLUDE CONTRACTOR LOSSES.
DOES NOT INCLUDE MISSION FAILURES.
DOES NOT INCLUDE TEST OPERATIONS LOSSES.

NASA HQ DS83-2431(I)
6-20-83

Figure 14

TOTAL COSTS TO NASA DUE TO MISHAPS*



* DOES NOT INCLUDE CONTRACTOR LOSSES.

* DOES NOT INCLUDE MISSION FAILURES.

* DOES NOT INCLUDE TEST OPERATIONS LOSSES.

NASA HQ DS83-2430(1)
6-20-83

Figure 15

ACCIDENT CAUSE ANALYSIS REPORT
(CIVIL SERVANTS)

Report No./Year (Calendar) 1982

INSTALLATION	MONTHLY TOTALS			QUARTER TOTAL	TOTAL TO DATE
SECTION I: SHIFT					
a.					15 63
b.					1
c.					
SECTION II: PART OF BODY INJURED					
a. Head					11 41
b. Eye					2 50
c. Face					12
d. Arm					7 50
e. Hand					4 48
f. Finger					4 79
g. Torso					11 30
h. Back					31 65
i. Chest					3 5
j. Abdomen					3
k. Leg					19 82
l. Foot					9 26
m. Toe					3 12
n. Other					5 17
SECTION III: AGENCY INVOLVED					
a. Animals					1 9
b. Boilers and Pressure Vessels					1 4
c. Chemicals					2 6
d. Conveyors					1
e. Dusts					1 18
f. Electrical Apparatus					6
g. Elevators					2
h. Hand Tools					3 39
i. Highly Flammable and Hot Substances					1 6
j. Heating Apparatus					2 5
k. Machines					2 28
l. Material Handling					20 86
m. Mechanical Power Transmission Apparatus					2
n. Prime Movers and Pumps					1
o. Radiation and Radiating Substances					1 3
p. Vehicles					5 22
q. Walking Surfaces					42 127
r. Agencies not elsewhere classified					23 153
SECTION IV: TYPE OF ACCIDENT					
a. Striking Against					9 108
b. Struck By					8 78
c. Caguht in, on, or between					2 28
d. Fall on same level					33 92
e. Fall to different level					3 13
f. Slip (not fall) or over-exertion					28 78
g. Exposure to temperature extremes					1 4
h. Contact with electric current					2
i. Inhalation, absorption, swallowing					5 10
j. Electric welding flash					
k. Foreign body in eye					1 35
l. Type of accident not elsewhere classified					12 58

NASA FORM 345 (REV. APRIL 66) Previous Editions Are Obsolete.

Figure 16

INSTALLATION	MONTHLY TOTALS			QUARTER TOTAL	TOTAL TO DATE	
SECTION V: UNSAFE MECHANICAL CONDITION						
a. Improper Guarding					2	11
b. Defective Substances or Equipment					11	41
c. Hazardous Arrangement					5	39
d. Improper Illumination					2	3
e. Improper Ventilation						4
f. Unsafe Clothing					7	21
g. No unsafe condition					47	304
h. Unsafe condition not elsewhere classified					28	85
SECTION VI: UNSAFE ACT						
a. Operating without authority						2
b. Operating or working at unsafe speed					6	39
c. Making safety devices inoperative					2	5
d. Using unsafe equip/hands instead of equip/equip unsafely					2	22
e. Unsafe loading, placing, mixing, etc.					2	19
f. Taking unsafe position or posture					20	89
g. Working or moving on dangerous equipment					1	4
h. Distraction, teasing, abusing, startling, etc.					4	16
i. Failure to use safe attire or pers. protective devices					5	21
j. No unsafe act					55	255
k. Unsafe act not elsewhere classified					6	40
SECTION VII: TYPE OF INJURY						
a. Abrasion					1	34
b. Avulsion					1	7
c. Burn, Chemical/Cryogenic					1	6
d. Burn, Thermal					1	10
e. Contusion					23	123
f. Dermatosis						2
g. Foreign Body						40
h. Fracture					13	21
i. Laceration					5	78
j. Puncture					2	17
k. Sprain or Strain					44	132
l. Toxicological					7	15
SECTION VIII: NO. LOST TIME INJURIES					4	24
Total					88	

SECTION IX: REMARKS

Legend

25	Denotes injury cases only.
5/25	Top number denotes lost-time injury cases. Bottom number denotes injury cases.

PREPARED BY: T.B. Kerr

SUBMITTED BY

ACCIDENT CAUSE ANALYSIS REPORT

(CONTRACTORS)

Report No./Year (Calendar) 1982

INSTALLATION	MONTHLY TOTALS			QUARTER TOTAL	TOTAL TO DATE	
SECTION I: SHIFT						
a.					54	71
b.					4	5
c.					1	1
SECTION II: PART OF BODY INJURED						
a. Head					13	152
b. Eye					14	235
c. Face					5	49
d. Arm					24	205
e. Hand					13	238
f. Finger					9	440
g. Torso					17	86
h. Back					74	272
i. Chest					2	25
j. Abdomen					9	27
k. Leg					30	224
l. Foot					12	83
m. Toe					3	32
n. Other					11	79
SECTION III: AGENCY INVOLVED						
a. Animals					1	38
b. Boilers and Pressure Vessels					1	7
c. Chemicals					9	114
d. Conveyors					2	6
e. Dusts					6	94
f. Electrical Apparatus					5	39
g. Elevators					1	11
h. Hand Tools					13	243
i. Highly Flammable and Hot Substances					2	25
j. Hoisting Apparatus					1	23
k. Machines					5	106
l. Material Handling					86	488
m. Mechanical Power Transmission Apparatus						7
n. Prime Movers and Pumps					1	3
o. Radiation and Radiating Substances						
p. Vehicles					14	105
q. Walking Surfaces					53	269
r. Agencies not elsewhere classified					35	567
SECTION IV: TYPE OF ACCIDENT						
a. Striking Against					18	529
b. Struck By					32	384
c. Caught in, on, or between					13	165
d. Fall on same level					18	126
e. Fall to different level					13	50
f. Slip (not fall) or over-exertion					103	383
g. Exposure to temperature extremes					7	32
h. Contact with electric current					4	10
i. Inhalation, absorption, swallowing					8	61
j. Electric welding flash					1	8
k. Foreign body in eye					11	170
l. Type of accident not elsewhere classified					14	228

NASA FORM 345 (REV. APRIL 66) Previous Editions Are Obsolete.

Figure 17

INSTALLATION	MONTHLY TOTALS			QUARTER TOTAL	TOTAL TO DATE
SECTION V: UNSAFE MECHANICAL CONDITION					
a. Improper Guarding					5 37
b. Defective Substances or Equipment					9 83
c. Hazardous Arrangement					25 176
d. Improper Illumination					3 6
e. Improper Ventilation					1 10
f. Unsafe Clothing					5 91
g. No unsafe condition					132 1291
h. Unsafe condition not elsewhere classified					56 445
SECTION VI: UNSAFE ACT					
a. Operating without authority					1 6
b. Operating or working at unsafe speed					6 55
c. Making safety devices inoperative					3 40
d. Using unsafe equip/hands instead of equip/equip unsafely					9 251
e. Unsafe loading, placing, mixing, etc.					36 179
f. Taking unsafe position or posture					54 397
g. Working or moving on dangerous equipment					2 10
h. Distraction, teasing, abusing, startling, etc.					9 103
i. Failure to use safe attire or pers. protective devices					14 165
j. No unsafe act					86 692
k. Unsafe act not elsewhere classified					16 286
SECTION VII: TYPE OF INJURY					
a. Abrasion					2 122
b. Avulsion					44
c. Burn, Chemical/Cryogenic					4 35
d. Burn, Thermal					7 64
e. Contusion					25 390
f. Dermatosis					26
g. Foreign Body					9 220
h. Fracture					21 44
i. Laceration					15 432
j. Puncture					3 91
k. Sprain or Strain					111 545
l. Toxicological					11 70
SECTION VIII: NO. LOST TIME INJURIES					8 57
Total					236

SECTION IX: REMARKS

Legend

25	Denotes injury cases only.
5/25	Top number denotes lost-time injury cases. Bottom number denotes injury cases.

PREPARED BY: T. B. Kerr

SUBMITTED BY

NASA RELATED ACCIDENTS AND FATALITIES IN 1982

DEFINITIONS:

1. NASA Mishap - Any occurrence, event, or anomaly that may be classed as a NASA accident, incident, or mission or test failure.
2. Type A Mishap - A mishap causing death, disabling injury to five or more person, damage to equipment or property exceeding $250,000*, or destruction of an aircraft.
3. Type B Mishap - A mishap causing disabling injury to four or fewer persons or damage to equipment or property exceeding $25,000*, but less than $250,000*.
4. Mission Failure - Any event which jeopardizes a mission, prevents accomplishment of major mission objectives, or causes premature mission termination (not generally included in this report).
5. Test Failure - An unexpected event which jeopardizes a test, prevents accomplishment of major test objectives, causes premature test termination, or destroys test hardware, test stands, or monitoring equipment. Losses or destruction of low cost models or test articles under circumstances where damage or loss is expected will not be considered test failures.
6. Incident - A mishap of less than accident severity to persons or property, causing less than $25,000 in damages, but exceeding $500, or a non-serious injury.
7. Near Miss - An unplanned occurrence in which there is no injury, no property damage, and no interuption of productive work, but which possess this potential.
8. Costs - Direct costs of repair, retest, delays, replacement, or recovery; including hours, material, and contract costs, but excluding indirect costs of clean-up, investigation, injury, and normal operational delay.

* The cost used in these definitions were changed in early 1983 and will be used in future reports.

SIGNIFICANT MISHAPS

The significant mishaps shown on the following charts are those reported by the NASA Field Installations and contractors as having significance beyond the minor dollar losses or injury incident categories.

FATAL ACCIDENTS AND FATALITIES

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
TOTAL NUMBER OF FATALITIES	17	3	3	1	6	1	1	0	9	2
NASA EMPLOYEES	7	0	0	0	2	0	1	0	4	1
CONTRACTOR EMPLOYEES	4	1	1	1	3	1	0	0	5	1
PUBLIC	1	2	2	0	1	0	0	0	0	0
MILITARY	5	0	0	0	0	0	0	0	0	0

TYPE A/B ACCIDENTS BY FIELD INSTALLATIONS

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982*
AMES	1/0	0/2	1/0	1/1	0/0	1/3	0/6	0/0	2/3	2/3
GODDARD	0/0	1/2	0/2	0/2	1/4	0/0	0/1	1/1	0/3	1/0
HDQTRS	-	-	2/1	0/0	0/1	0/0	0/0	0/0	0/0	0/0
JOHNSON	1/0	0/5	0/1	0/0	2/1	0/0	0/2	1/0	2/0	2/1
KENNEDY	0/1	2/1	4/1	0/0	2/1	0/0	0/0	0/1	5/3	1/2
LANGLEY	0/1	0/1	0/2	1/1	0/0	0/1	0/0	0/0	3/4	1/0
LEWIS	0/1	0/0	0/1	0/1	0/0	0/0	1/1	0/0	0/2	0/0
MARSHALL	1/0	1/0	1/1	0/0	1/0	0/0	0/0	2/1	1/0	4/2
NSTL	-	0/0	0/1	0/1	1/0	0/0	0/0	0/0	1/1	1/0
NASA TOTAL	4/6	7/11	10/12	2/9	8/7	1/4	1/10	4/3	14/16	12/8

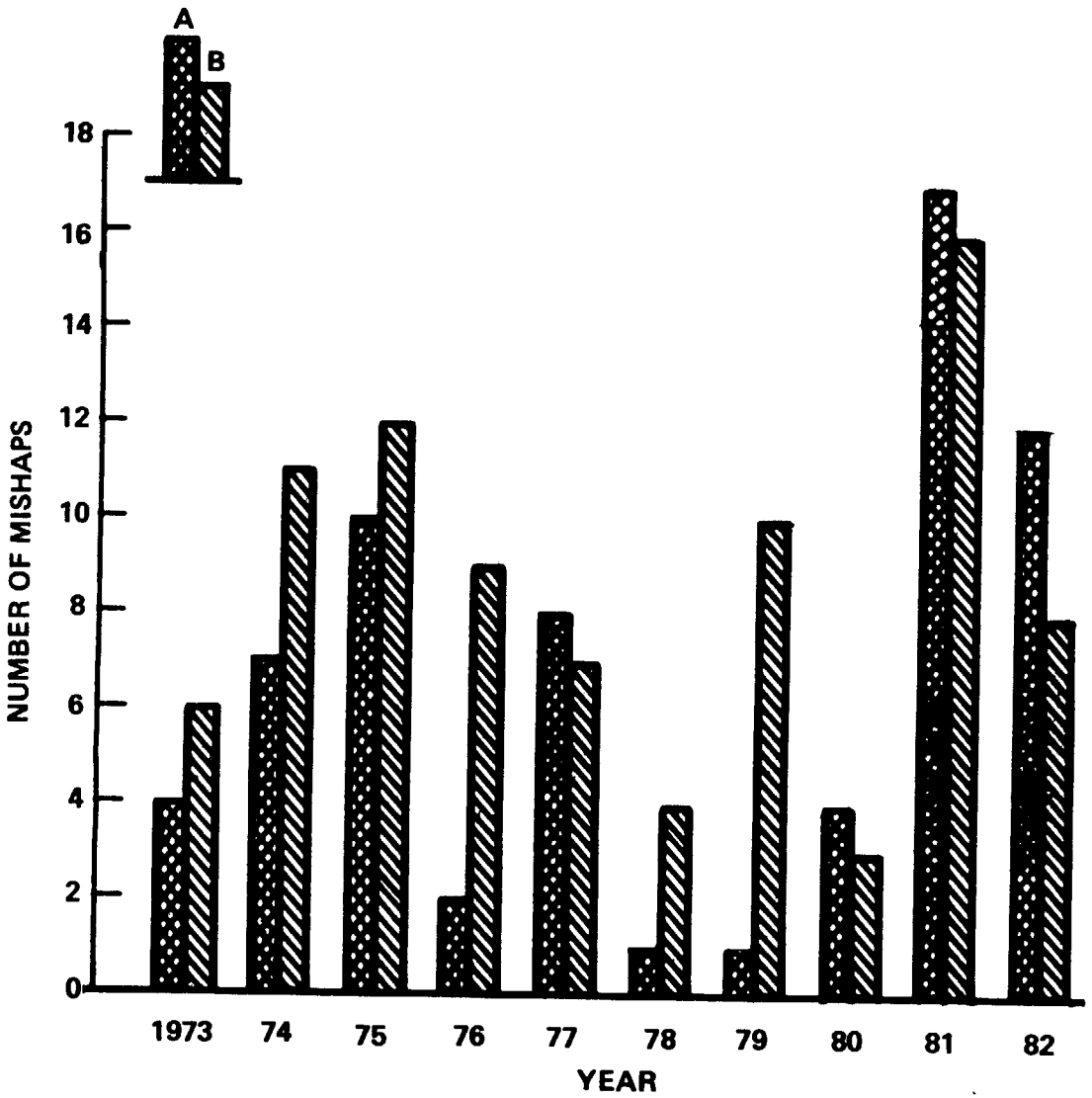
Notes: The Type "B" individual injuries are not listed in this table, but the number of injuries are shown in the summary in Figure 5, p.6.

* Mission and Test failures are included in these numbers.

Although Test Operations accidents and Mission failures are not included in most sections of this report they are included in the table above for 1982 and in the next several pages of descriptive material. These types of mishaps are associated with program activities and are reviewed in detail by program offices. This does not reduce any safety responsibilities for NASA operations. However, it recognizes that these mishaps occur at facilities where the nature of the operations involve predictably high risks/hazards.

The combination of Type "A" and "B" mishaps in 1982 was 20 as compared to 30 in 1981, and the number of Type "A" mishaps was 12 compared to 14 in 1981. The 12 Type "A" mishaps include five Test and Mission failures in 1982. Therefore, it is not possible to compare the numbers directly. This suggests an improvement in safety awareness as compared to 1981, but the fact that some of these mishaps occurred at all indicates a need for tightening up management controls and operational procedures as indicated by recommended corrective actions. This should include design reviews of test items, test apparatus, and procedures and compatibility of the associated support equipment.

NASA TYPE "A" AND "B" MISHAPS



TYPE A: Fatality
- 1973-81: Greater $100K
- 1982: Greater $250K

TYPE B:
- 1973-81: $10K to $100K
- 1982: $25K to $250K

Test failures and mission failures were not included prior to 1981, nor were contractor fatalities included in some cases.

1981
- 3 SSME test failures
- 4 contractor accidents with fatalities

1982
- 4 SSME test failures and the SRB parachute failure included.
- 1 contractor fatality.
- 1 NASA fatality

Figure 18

NASA HQ D683-2438(1)
6-20-83

TYPE "A" ACCIDENTS - 1982

LOCATION	DATE	DESCRIPTION	CAUSE	COST	RECOMMENDED CORRECTIVE ACTION
LaRC	01-29-82	-Landing Gear Test Facility--20 hydraulic fluid control valves for arresting gear were not opened. Carriage impacted Traction Shop because arresting gear did not stop it.	-Procedures were not followed to mechanically unlock valves for this operation.	$1.5 M	-Management emphasis on daily operations, formal sign-offs on checklists, and procedure for critical safety items -Add limit switches to valves. -Do not store heavy equipment in Traction House or park cars near it. -Add visual aids to equipment.
MSFC Santa Susana	02-12-82	-Propulsion Test--High Pressure Fuel Pump Turbine temperature redlined. Extensive erosion damage to turbines, injector, combustion chamber, nozzle, hot gas manifold. Hydraulic line burst from hot gas impingement.	-Ice blocked several fuel preburner (FPB) inlets causing combustion to have abnormally high oxygen-to-fuel ratio, thus high FPB temperatures.	$15 M	-Re-examine all repair, maintenance, and inspection procedures to evaluate possibility of introducing foreign matter, particularly water, into the engine. -Prove, by testing, methods for removal of contamination from engine. Re-examine purge drying procedures.
GSFC	03-15-82	-Contractor employee electrocuted while performing mechanical maintenance. Arm was grounded to metal surface of equipment when 110 VAC touched forehead.	-Failed to disengage two electrical breaker switches to shut off power.	Fatality	-Apply better verification methods for electrical current interrupt; e.g., ammeter. -Ensure adequate clearance around electrical equipment. -Incorporate specific safety guidelines into Facilities Engineering Handbook regarding location and relocation of equipment . -Raise awareness of all people to low voltage dangers. -Display warning signs on equipment access doors to describe local disconnect location. -Improve distribution of safety directives and procedures.

NSTL	04-07-82	-Propulsion Test--LOX preburner accelerometer exceeded vibration redline of 12 G's. Engine destroyed; extensive damage to wiring, tubing, instrumentation, valves.	-New coolie hat nut design provided direct gas leak path to bearing end cap. LOX rich environment due to fuel loss caused combustion.	$26 M	-Discontinue use of new coolie hat nut design. -Add vibration and turbine discharge temperature redlines to certification tests. -Assure anomalies are thoroughly reviewed and resolved and comply with procedures for specified current assembly. -Improve pre-burner temperature distribution and reduce turbine inlet temperature. -Do not test new designs for the first time on certification engines.
JSC Palmdale	04-16-82	-Orbiter Checkout--Quick Disconnect (QD) valve failed and blew out under 3000psi on OV-099. Approx. 30 gal. hydraulic fluid spilled over 200 tiles on tail and elevons.	-QD was neither mated for flight nor capped for test.	$461 K	-Install temporary QD cap tethers to preclude losing caps when not installed. -Review and amend all hydraulic system procedures as necessary to open isolation valves. -Review drawings and specs for similar disconnect usage. -Document tests performed on QD's in Downey hydraulic lab.
MSFC Santa Susana	05-15-82	-Propulsion Test--Oxidizer pre-burner valve on engine 0107 leaked after closing. High pressure oxidizer pump turbine damaged.	-Reduced cross-sectional area of seal cracked under shutdown loads and failed to stop oxidizer flow.	$4.4 M	-Arrange system for prevention of backflow of gases; increase use of instrumentation in R&D testing. -Review adequacy of component leak and functional tests. -Establish criteria to document anomalous observations. -Apply preventive measures of reverse assembly of inline orifice; survey similar reverse assembly and apply corrective action.

MSFC	06-27-82	-STS Solid Rocket Boosters (SRB)--Both STS-4 SRB's were lost due to malfunction in main parachute deceleration systems. SRB's impacted at high velocity and were not recovered.	-G-switch closed upon firing of pyrotechnic charge instead of on H_2O impact leading to premature separation of one of two riser lines attached to each of three main parachutes.	$36 M	-Replace pyrotechnic separation bolt with a hard mounting. -Reassess potential adverse effects of separation pyro shock upon components mounted in frustum and forward skirt . -Evaluate need for redundancy in areas where system is most susceptible to failure modes. -Develop improved acceptance criteria and inspection techniques for Deutsch connectors. -Incorporate telemetry system in boosters. -Reassess SRB design to identify/eliminate improper installation of cables. -Assess routing of cables which transmit critical redundant signals.
MSFC Santa Susana	08-27-82	-Propulsion Test--R&D SSME 2208 failed after 115 sec. at 111% capacity, reached 16-20 G's. Large fire followed.	-Suspect pump failure	$10-12 M	
ARC	11-08-82	-T-37 (NASA 807) crashed 16 miles from DFRF. Airplane impacted ground in a spin. Pilot initiated ejection at too low altitude to permit survival.	-Cause of spin unknown. Pilot was probably knocked unconscious and could not initiate ejection early enough.	Fatality + $500 K	-DFRF modification of aircraft involving safety of flight should have written approval. -Revise procedures to assure currency of pilots flight manuals. -Clearly define FACT SHEET information as to whether it is advisory or directive in nature. -Develop policy to enhance management oversight of research support and proficiency flights. -Emphasize emergency escape altitudes, disorientation effects of transitory pos-neg "g's" on pilots. -Equip aircraft with flight recorders.

JSC	11-30-82	-NASA T-38A landed on north runway at Ellington AFB, departed runway and traveled 1,000 ft. Main landing gear collapsed, airplane stopped on south-east taxiway.	-Dynamic hydroplaning and subsequent reverted rubber skidding. Left-quartering tailwinds.	$685 K	-Implement measures on runway to reduce hydroplaning/skidding. -Update IFR and other pertinent publications to caution aircrews on water hazards at the runway intersection. -Incorporate a discussion of landing techniques on a wet runway with adverse winds, including hydroplaning effects, into the JSC Aircraft Operating Procedures and T-38A Flight Manual. -Devise means for tower to monitor rainfall rate and runway condition and advise pilots of such.
ARC	12-09-82	-Facility Checkout--Turning vane set collapsed and fell into drive units during a test run of 80x120 ft. wind tunnel. Vane set, drive motor fan blades, nose cones, W.T. walls and floors damaged or destroyed.	-Slippage of a mechanical adjustable link.	$10 M	-All configuration changes to the wind tunnel should follow a Request for Change (RFC) approval. -Hardware modifications which affect form/fit/function should be performed with documented procedures. -If gross deviations from calculated data values are experienced during testing, test should be interrupted, all associated systems analyzed. -Institute formal system for establishing redlines on critical parameters. -Measurments on components liable to cause a catastrophe should be monitored continuously; redline violations should terminate test. -Sufficient diagnostic instrumentation should be used in shakedown testing of rebuilt. -Thorough SR&QA analysis/evaluation of rebuilt should occur before use.

KSC	12-10-82	-Convoy transporting Atlas Centaur nose fairing took wrong route. Fairing hit overhead power lines; damaged nose fairing, broke two 13,500V power lines, three guy wires.	-Breakdown in communication. Adequate procedural instructions not given.	$650 K	-Convoy commander should perform a pre-departure briefing to all key participants. -Move operation details should be a separate procedure or a separate section of procedure. Details should include: route(incl. route within complexes), hazards, convoy point of origin, convoy commander, planned stop points, speed limits, communication checks. -Improve convoy communication network and ensure that personnel follow procedures. -Include recommendations in KSC/CCAFS management instructions. Pre-departure instructions should cover all organizations.

TYPE "B" ACCIDENTS - 1982

LOCATION	DATE	DESCRIPTION	CAUSE	COST	RECOMMENDED CORRECTIVE ACTION
KSC	04-21-82	-STS Checkout--Four IF connectors were demated to remove insulation blanket on Rudder Speed Brake (RSB) Power Drive Unit. Hydraulic power was brought up to position main engine, thus RSB exceeded design limits and was damaged.	-	$122 K	-
KSC	06-02-82	-During rotation of 2nd stage of Delta launch vehicle, nozzle extension struck pad apron, severely buckling, wrinkling, and creasing shell structure.	-Deficiency in erection procedure, insufficient engineering knowledge.	139 K	-Revise Second Stage Erection and Mating Procedure. Adhere to FTC guidelines. -Establish technical task force to review procedures for new design. -Ensure all critical hoisting/lifting documents include a diagram to define proper orientation of lift/attach points. -Strenghthen technical coordination. -Issue all procedures in time for a proper review prior to use.
MSFC	06-27-82	-Bearing seal materials tester turning in liquid oxygen caused the shaft to cease and burn.	-	$200 K	-
ARC	08-26-82	-Wind Tunnel--A rag left in the intake section of a simulator model was ingested into the engine, damaging the compressor during start-up.	-Failure to remove rag after troubleshooting. Failure to discover rag prior to testing.	$40-60 K	-Establish "pre-flight" type inspection of engine inlets for foreign matter. -Fabricate inlet covers for engine simulators to be applied when test section is opened, removed prior to test section closing. -Operator should receive verification from person who removed covers that inlets are clear. -Develop specific checklists for ALL testing modes.

ARC	09-03-82	-Wind Tunnel--Several pieces of distorted steel straps torn loose from leading edge of turning vanes and ingested by compressor were found downstream of compressor during a routine inspection of 14ft. wind tunnel.	-Steel strap had failed. Insufficient amount of weld material fastening steel straps; welds failed.	$25 K	-Remove all unecessary attachments including remaining straps. -Inspect and repair as necessary all welds and instrumentation upstream of compressor. -Documentation and review of future modifications should be conducted; review procedures. -Modification of harsh flow entering screen is necessary; screen protection should be restored to 100% of area.
JSC	09-03-82	-Aviation Maintenance--While undergoing maintenance, a NASA 2 Gulfstream slipped right aft from its jacks. Right wing, nacelle, and propeller were damaged.	-Right main gear ground safety pin improperly installed. Faulty jacking procedures.	$175 K	-Final verification of proper installation of ground safety pins to be made by Gulfstream flight crews. Advise of jack. hazards. -Develop detailed procedures, cautions, and instruction materials for ground safety pin; placards be placed. -Thorough investigation of NASA aircraft jacking procedures. -Review landing gear functional test procedures currently in use.
MSFC Michoud	12-06-82	-STS Tank #6: hydrogen fitting contacted work platform; cracked weld around fitting and oil canned the tank.	-		-Follow procedures when moving tanks.
ARC	12-29-82	-During maintenance check flight of 990 (NASA 712) bird was ingested into engine #2. Compressor damaged.	-	$30 K	-Little can be done to prevent these bird strikes.

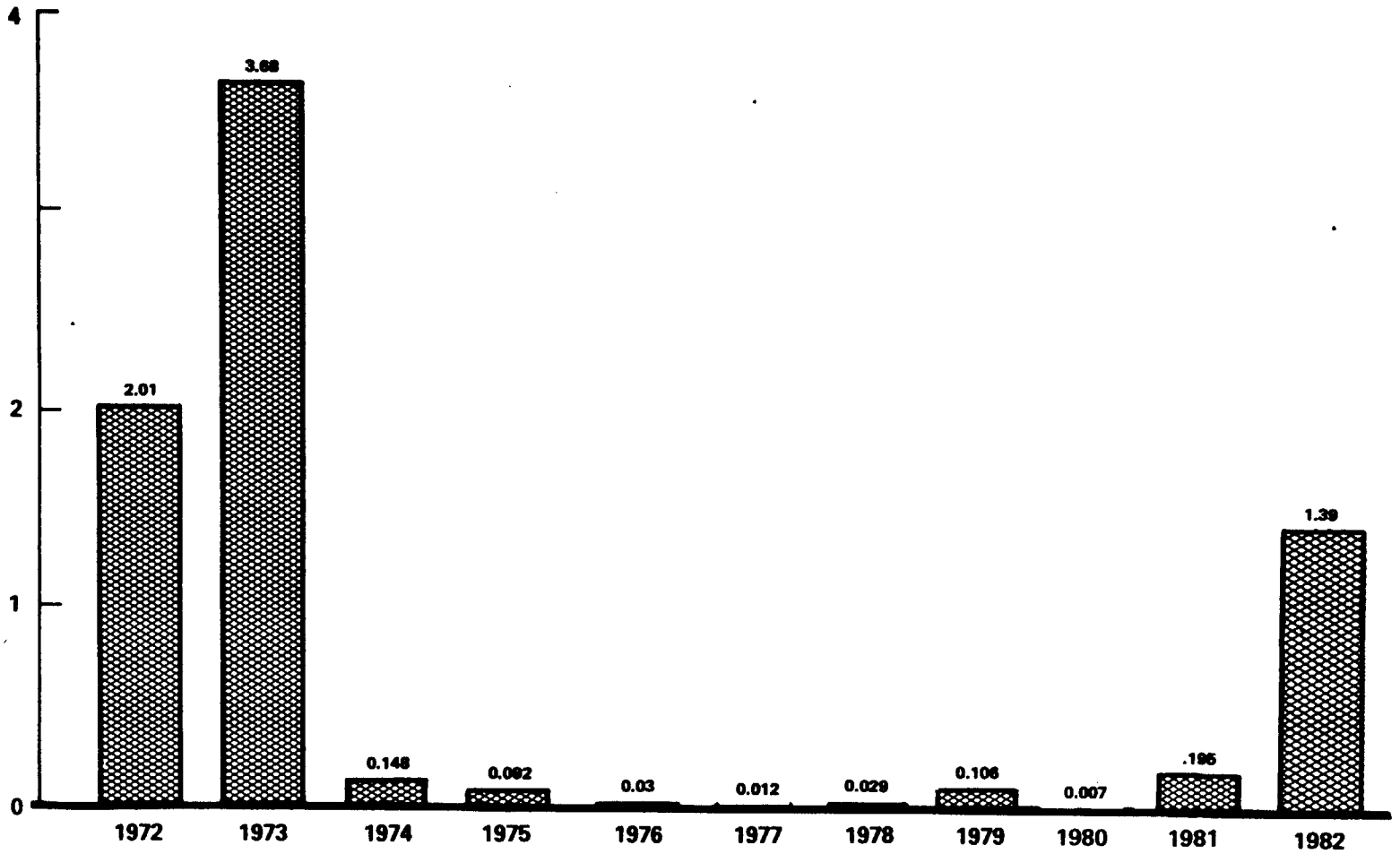
NASA AVIATION ACCIDENT/INCIDENT EXPERIENCE IN 1982

In 1982 NASA enjoyed an accident free record for most of the year until November when we experienced accidents at three centers. A T-38 crashed during landing at Ellington AFB, Texas, at night and during poor visibility. The cause of the accident was landing gear hydroplaning on the runway causing the aircraft to depart the runway and the gear collapsed.

The second, a fatal accident involving a T-37B trainer, occurred north of Edwards Air Force Base, California. The board was unable to establish a probable cause for the accident. The aircraft apparently spun from altitude until impact destroyed the aircraft. Indications are that the pilot attempted to eject but at too low an altitude to save his life. It is interesting to note that neither of these flights involved research or research aircraft which is normally considered to be higher risk in nature.

A less serious, but costly ($175 K), mishap occurred during maintenance on NASA 2 when a wing, nacelle, and propeller were damaged. A bird strike on the ARC 990 damaged an engine. There is little we can do to prevent birdstrikes and other uncontrolled actions.

NASA AIRCRAFT LOSSES



NASA HQ DS83-2431(1)
6-20-83

Figure 19
32

NASA MOTOR VEHICLE ACCIDENTS

There was a decrease in the government automotive accident frequency rate and an increase in the costs of accidents for 1982. However, the goal of 5.0 accidents per million miles driven, which we met in 1973 and again in 1980 and 1981, was achieved and surpassed again this year. The rate was 3.80 (down from 3.94 in 1981), but the costs were up to $15,000 as compared to $11,000 in 1981.

Two installations reported zero accidents while driving 534,000 miles in government-owned vehicles, and six installations reported zero accidents while driving 3,574,000 miles (official business) in privately owned vehicles. This is 6% and 58% percent, respectively, of the total miles driven.

There were 5 accidents reported which involved employee's private vehicles while driving 6.2 million miles for official business. There were 34 accidents to government-owned vehicles while driving them 9.0 million miles. Management is urged to continue to evaluate the driving practices and disciplinary needs to get the attention of those who do not observe traffic laws and good driving practices.

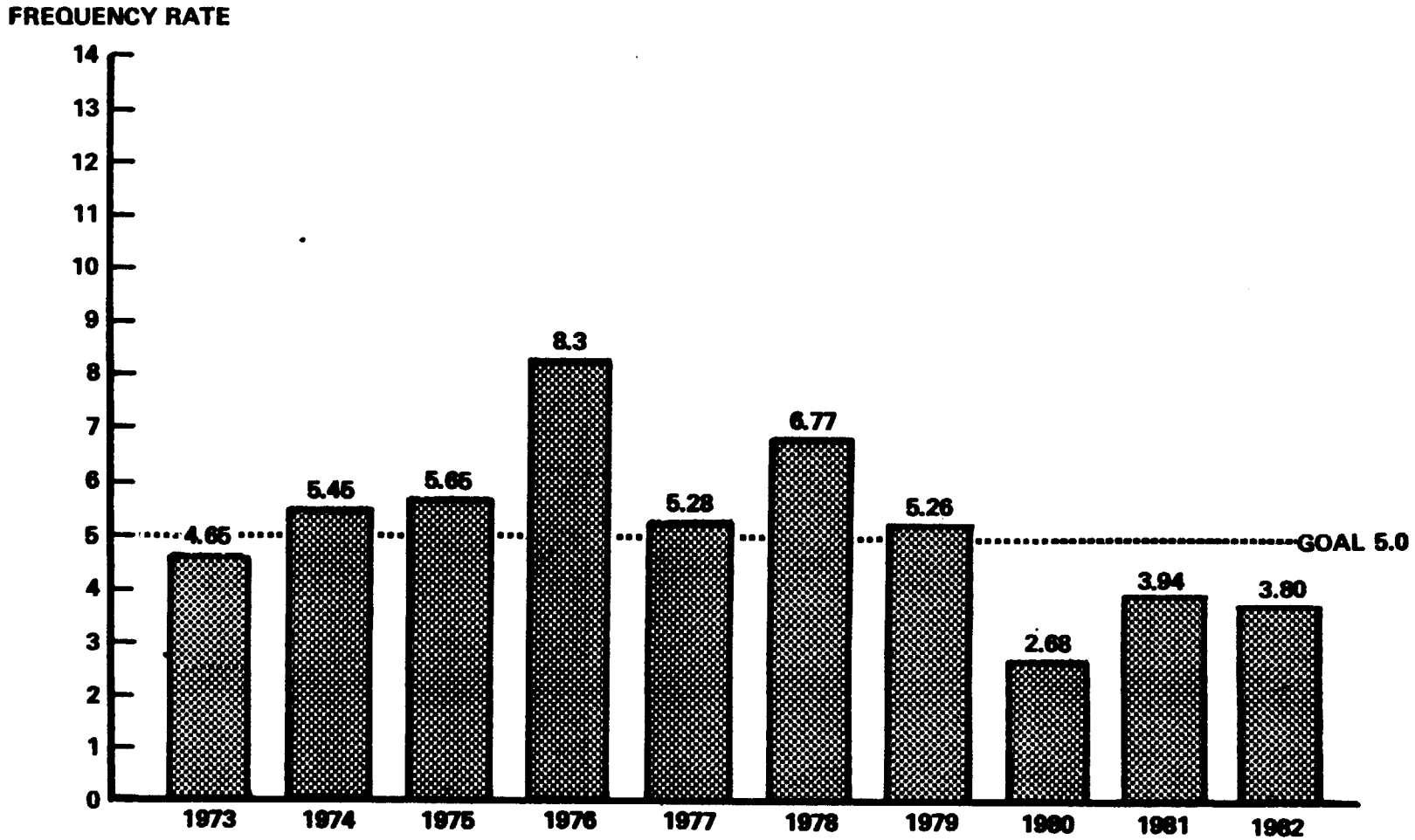
NASA 1982 MOTOR VEHICLE ACCIDENTS

Field Installations	No. of Accidents		Total Miles Driven (in thousands)		Total Cost ($)		Frequency Rate* of Accidents	
	Govt.	Private	Govt.	Private	Govt.	Private	Govt.	Private
ARC	2	0	1,088	957	729	0	1.84	0
GSFC	7	1	2,794	1,175	6,188	0	2.51	0.85
HQ	11	0	142	480	2,592	0	77.38	0
JSC	4	2	104	978	1,000	412	38.54	2.04
KSC	1	0	1,414	810	298	0	0.71	0
LaRC	0	0	534	768	0	0	0	0
LeRC	3	0	872	543	1,412	0	3.44	0
MSFC	6	2	2,007	426	2,792	1,850	2.99	4.70
NSTL	0	0	0	16	0	0	0	0
TOTALS	34	5	8,955	6,154	15,011	2,262	3.80	0.81

* FREQUENCY RATE IS THE NUMBER OF ACCIDENTS PER MILLION MILES DRIVEN

Figure 20

NASA GOVERNMENT MOTOR VEHICLE ACCIDENTS

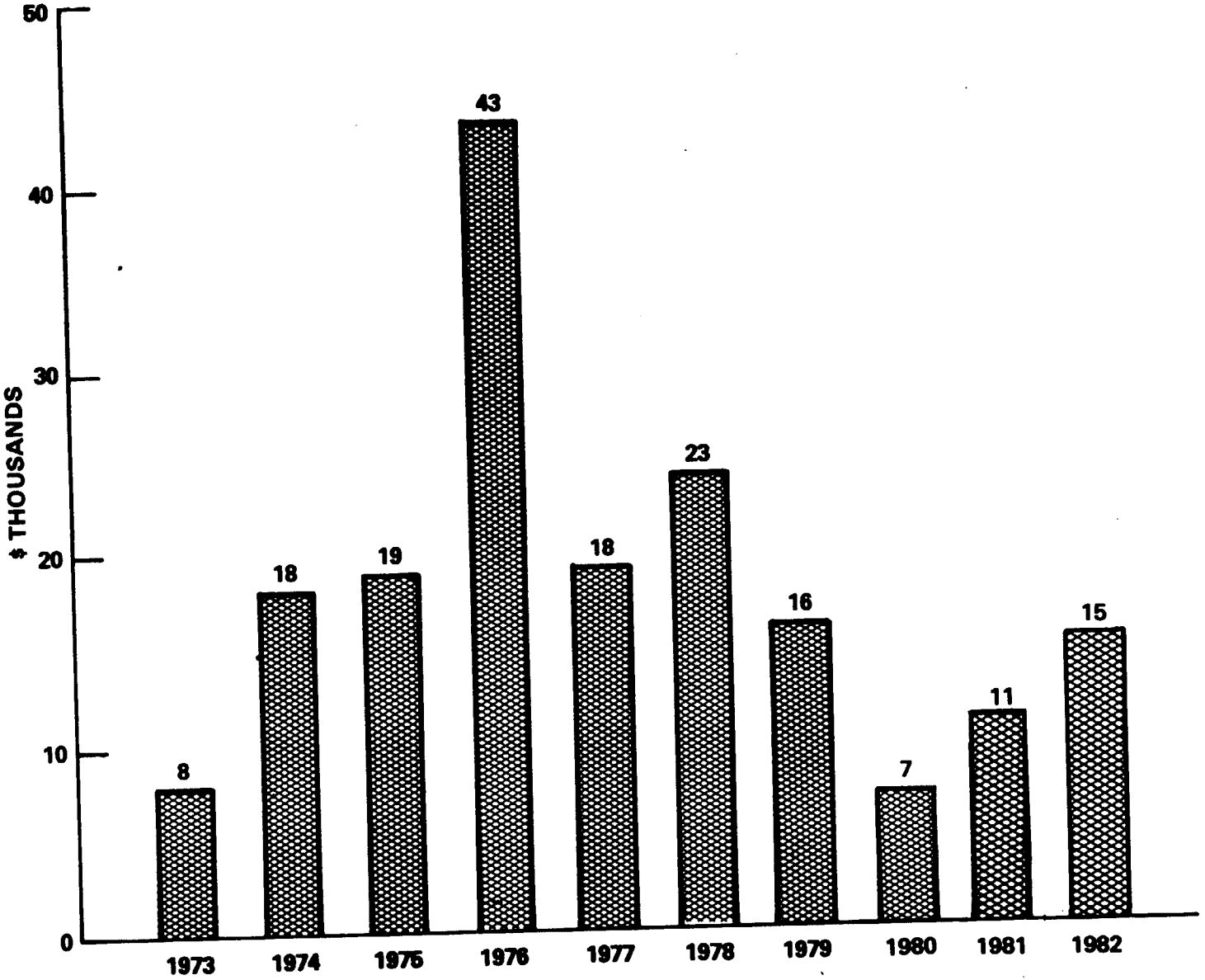


FREQUENCY RATE IS THE NUMBER OF MOTOR VEHICLE ACCIDENTS PER MILLION MILES DRIVEN.

NASA HQ D883-3429(1)
6-20-83

Figure 21

NASA AUTOMOTIVE LOSSES



NASA HQ D883-2434(1)
6-20-83

Figure 22

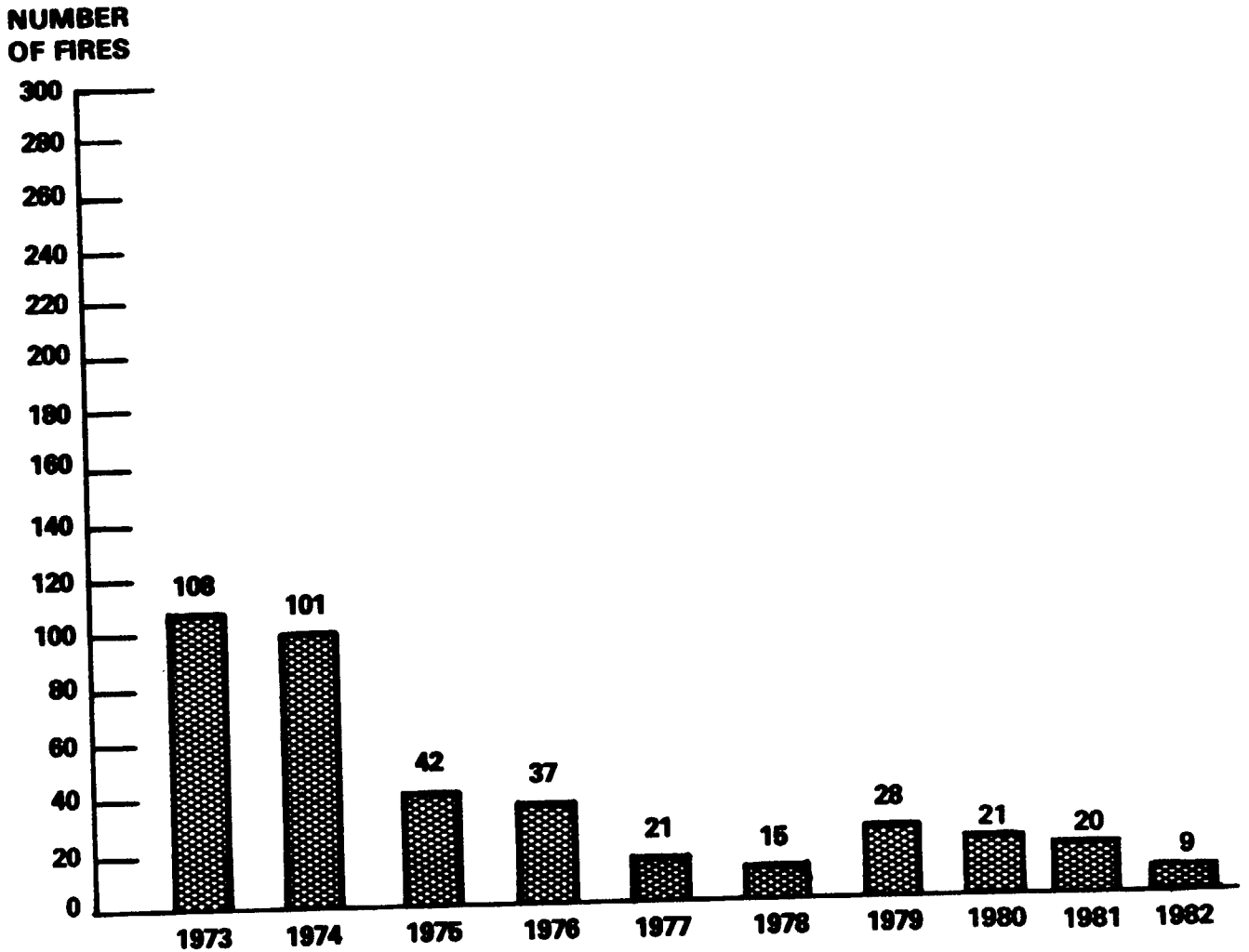
NASA FIRE EXPERIENCE IN 1982

The number of institutional fire mishaps in our facilities and equipment decreased to 9, and their costs for 1982 decreased to $75,400. We continue to have reduced fire losses in buildings and facilities as a direct result of extensive fire prevention activities, excellent fire safety awareness, and a substantial investment in fixed fire detection and suppression systems.

Programs to provide fire detection and suppression systems and to require safe materials and construction must continue. These activities start in the design process and continue through all phases until project completion. Training and education of employees and professional development of fire safety personnel should continue to be stressed. The use of balanced risk surveys help to identify major areas for improvement. These surveys provide input for our long term planning.

Although special precautions are taken during high-risk test operations, fires related to test failures still dominate our fire losses. These losses are not included in this report.

NUMBER OF NASA FIRE MISHAPS



DOES NOT INCLUDE TEST OPERATIONS
DOES NOT INCLUDE MISSION FAILURES

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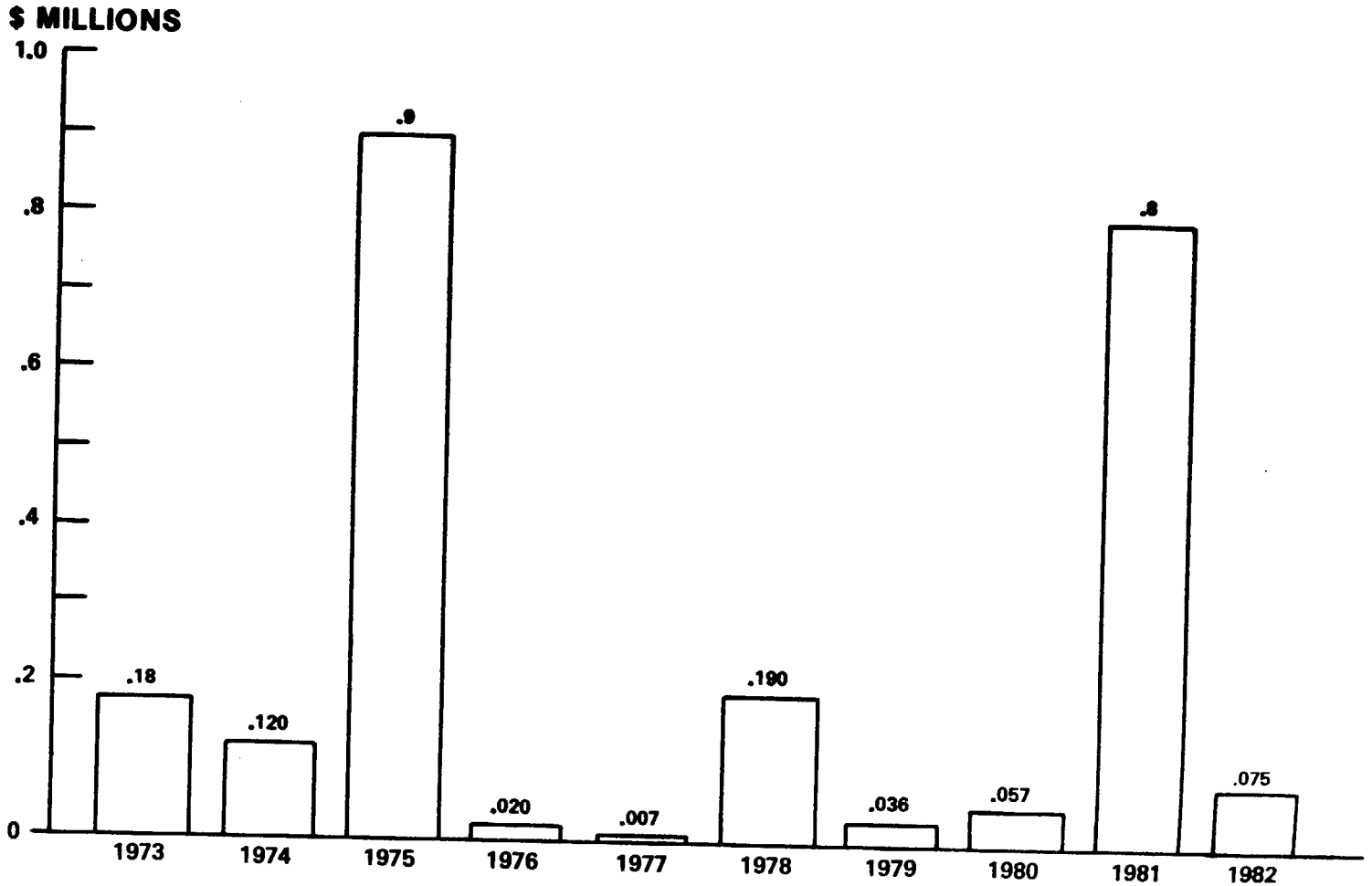
Figure 23

NASA FIRE LOSSES



DOES NOT INCLUDE MISSION LOSSES OR TEST OPERATIONS LOSSES.

Figure 24

NASA HQ DS83 2433(1)
6-20-83

NASA SAFETY RELATED GOAL STATUS

As part of the overall effort to reduce mishaps in NASA, goals were specified as indicated in the table on page 41, "Goal Status (12/31/82)" and for 1983 on page 42. Of course, the desired goal for everyone is no mishaps; however, in a dynamic program of research and operations, there will be losses. Further, with people involved, individuals will be injured or become ill. With this in mind, the goals are intended to cause individuals and management to take interest in personal actions as well as operational activities.

In some instances the goals are higher than the previous year's rates. These are not intended to suggest a relaxation of efforts, but instead, they recognize previous history and allow for some fluctuation from year to year as the overall program improves. By examining the cumulative status columns, one can readily see the problem areas or the areas which appear to be sufficiently out of line with the remainder of NASA and/or NASA contractors to cause positive action to be taken by management to improve these areas.

There are other areas where commendations are in order; e.g., ARC made a dramatic improvement in Lost Time Injury Rate, JSC and MSFC continue to maintain low rates for Lost Time Injuries, and there have been some significant reductions in contractor Lost Time Rates, as well as some reductions in numbers of mishaps and dollar losses.

Accomplishment of present goals and suggestions for next year's goals should be of interest at each installation. Although the overall NASA safety performance has improved in some areas, their are many things we can do to prevent personnel injuries and illnesses and avoid facility and equipment losses.

GOAL STATUS (12/31/82)

	Type A			Type B Property Damage			NASA Employee Lost Time Rate			Contractor Employee Lost Time Rate			Monetary Losses ($K)			Initial Inspection, Analysis, Testing (%Complete)		
	1981	Goal 1982	Cumulative Status Thru 4 Qtr.	1981	Goal 1982	Cumulative Status Thru 4 Qtr.	1981	Goal 1982	Cumulative Status Thru 4 Qtr.	1981	Goal 1982	Cumulative Status Thru 4 Qtr.	1981	Goal 1982	Cumulative Status Thru 4 Qtr.	1981	Goal 1982	Cumulative Status Thru 4 Qtr.
ARC	2	1	2	3	1	3	.93	.96	.13	unk	.70	2.20	388	250	@ 779	22	40	30
GSFC	0	0	** 1	3	1	0	.61	.54	.84	.74	.74	.44	@ Does not include 40 X 80 (est. greater $10 Million).					
HQ(CODE N)	0	0	0	0	0	0	.58	.50	1.07	0	.30	0	106	95	0	83	95	100
JSC	2	1	3	0	0	0	.13	.30	.30	0.94	2.16	1.00	420	400	712	N/A	N/A	
																(JSC) 100	100	100
																(WSTF) 80	100	100
																(DwPd) 0	50	30
KSC	5	2	1	3	1	2	.29	.43	.34	1.01	.91	.97	unk	?	1,021	17	30	19.5
LaRC	3	1	1	4	1	0	.32	.49	.45	unk	2.50	3.00	246	Excd. 1981	1.5M	5	10	10
LeRC	0	0	0	2	1	0	.74	.84	.71	unk	.62	.59	176	150	1.4	15	30	30
MSFC	1	2	5	0	0	2	.31	.30	.19	1.90	1.50	.65	26,425 *	Excd. 1981	95,600	12	30	40
NSTL	1	0	0	1	0	0	2.46	.85	0	1.91	1.50	.36	unk	10	0	35	60	62

* Includes SSME Test Failures
** Contractor fatality

Figure 25

GOAL STATUS (CY 1983)

	Type A[1]			Type B[1] Property Damage			NASA Employee Lost Time Rate			Contractor Employee Lost Time Rate			Monetary Losses ($K)			Initial Inspection, Analysis, Testing (%Complete)		
	1982	Goal 1983	Cumulative Status Thru 1 Qtr.	1982	Goal 1983	Cumulative Status Thru 1 Qtr.	1982	Goal 1983	Cumulative Status Thru 1 Qtr.	1982	Goal 1983	Cumulative Status Thru 1 Qtr.	1982	Goal 1983	Cumulative Status Thru 1 Qtr.	1982	Goal 1983	Cumulative Status Thru 1 Qtr.
ARC	2	1	0	3	2	1	.13	.30	.35	2.20	2.00	.67	10,000	1,000	357	30	44	30
GSFC	1	0	0	0	0	0	.84	.60	.79	.44	.40	.56	0	100		(WFF)50	70	51
HQ(CODE N)	0	0	0	0	0	0	1.07	.50	.77	0	.30	0	0	0	0	NA	NA	
JSC	3	1	0	0	0	0	.30	.30	.43	1.00	.80	1.07	712	500	0	(DwPd)30	44	30
KSC	1	0	0	2	1	1	.34	.30	.37	.97	.80	.61	1,021	500	60	20	36	20
LaRC	1	0	0	0	0	0	.45	.40	.15	3.00	2.00	3.23	1,500	250	0	10	28	11
LeRC	0	0	0	0	0	0	.71	.60	.35	.59	.85	1.42	1.4	100	0	30	44	(33)
MSFC	5	2	0	3	1	0	.19	.30	.25	.65	.45	1.40	95,600	50,000	1.5	40	52	(43)
NSTL	0	0	0	0	0	0	0	0	0	.36	.30	1.55	0	100	0	60	68	65

1 Centers should indicate by footnote how many of the Type A and B Mishaps listed in these columns are considered mission or test failures.

LOST TIME INJURY/ILLNESS BRIEFS
1982
(GOVERNMENT EMPLOYEES

DAYS	DESCRIPTION OF MISHAP
111	Leaned forward in chair, chair tilted forward and rolled back throwing employee on floor with chair on top; fractured vertebra.
45	Fell on wet floor; broken rib.
41	Slipped and fell on sidewalk; fractured hip.
33	Re-injured back after moving heavy material.
33	Tapping radial arm drill press; pinched medial meniscus, right knee.
30	Slipped and fell on steps; sprain and contusion of right wrist.
29	Lost balance and fell on leg; contusion and strain of left leg.
28	Handicapped employee fell and injured foot.
28	Bending over to lift an object; pulled back muscle.
24	Employee fell when caster to office chair broke; sprained back.
21	Turned ankle on ice covered surface; fracture, left ankle.
19	Slipped on ice getting out of car; sprain, left knee.
16	Chair overturned; contusion of right buttock.
15	While on travel, slipped and fell on wet floor.
15	Strained back while lifting.
15	Fell on stairs; twisted back.
15	Fell on boxes; fractured rib, bruised elbows and shoulders.
14	Backed into work bench; muscle spasm.
12	Slipped on stairs; broke left wrist.
11	Struck by automobile; fractured sternum, contusions.
11	Bumped head on support brace in confined space; inner ear injury.
10	Lifting boxes; sprained back.
10	Stepped on staple, fell against door; sprained right ankle, contusion of right buttock.
9	Slipped on sidewalk ramp; injured right ankle.
9	Foot slipped on front of stair; contusion and sprained right ankle.
9	Slipped and fell on ice in parking lot; concussion
8	Lifting boxes of file folders; strained lower back.
8	Hit ankle on object; blood poisoning.
8	Moving valves from storage to test position; torn ligament in knee.
8	Lifting heavy documents; strained back.
7	Picked up heavy box; sprained back.
7	Hanging pictures in office, bent over to pick up hammer; severe low back pain, pinched sciatic nerve.
7	Foot slipped on step; reinjured right achilles tendon.
6	Laying sheet of masonite on floor; back strain.

6 Knelt on fiber board particles; infection left knee.

6 Removing fence post from ground; back strain.

6 Became ill after inhaling paint fumes.

6 Slipped and fell in cafeteria on water tracked in from outdoors; fractured elbow.

6 Eye came in contact with laser beam; partial permanent blindness.

6 Applied pressure with hand to screwdriver to remove corroded screws; hand received compression injury requiring surgery.

5 Slipped on snow covered sidewalk; lumbar strain.

5 Strained back while lifting.

5 Punctured hand with fine gauge wire; infection.

5 Fell while reviewing construction site; broke ankle.

5 Used TMC solvent to clean in confined space without adequate ventilation or breathing air respirator.

4 Getting out of car, slid on ice; lower back strain.

4 Fell down steps; sprained ankle.

4 Working in area where painting was being done; possible allergic reaction to paint fumes.

4 Fell off chair that was placed on a table for scaffold access; strained left knee.

4 Bent over, lost footing; turned ankle.

4 Employee pulled muscle while accessing scaffold.

3 Leaned on moveable object, it moved, fell; injured back.

3 Reaction to bee sting.

3 Fell in parking lot; fractured right rib.

3 Doing instrumentation in wind tunnel; lower back strain.

3 Attending altitude test chamber flight, ears blocked; infection, both ears.

3 Slipped; strained back.

3 Punctured foot with screwdriver.

3 Slipped, did not fall down steps; contusion to shoulder.

3 Walked into glass panel; contusion to head.

3 Slipped and fell on steps; contusion to knee.

3 Fell on sidewalk while trying to avoid bee; sprained back.

3 Stepped out of airlock on mockup; sacroiliac strain.

3 Operating saw without blade guard in place and without operative brake guard; lacerations of fingers.

3 Performing drilling operation, material pulled out of vice, struck operators hand; thumb lacerated.

3 Accessing ladder in wind tunnel, slipped; sprained foot.

3 Slipped while walking inside wind tunnel; contusion and abrasion of back.

2 Slipped and fell, hit head on Guard's desk; bruised hip, cut head.

2 Slipped and twisted foot; contusion right foot and ankle.

2 Picked up file that was on floor; back sprain.

2 Slipped on ice at rear of building; lumbar sprain.
2 Lifting boxes and books; muscle spasms lower back.
2 Slipped and fell on loading dock; contusions.
2 Given overdose of medication by Health Unit.
2 Fell on roadway; sprained ankle.
2 Extended work in confined space; strained shoulder.
2 Slipped on floor; sprained right ankle, stained left forearm, possible slight concussion.
2 Slipped on pebbled walkway; low back syndrome.
2 Working at desk; insect bite on left arm.
2 Portable hydraulic cart fell through false flooring, struck employee; fractured jaw and ribs.
2 Closed arm in elevator door while entering.
2 Employee working overhead in cramped position; back strain.
1 Slipped on wet floor; hit head, hurt back.
1 Auto accident; bruises, concussion, headaches.
1 Slipped on floor; bruised knee.
1 Finger caught between table & wall; broken finger.
1 Installing rivets to fasten an angle iron to wall; neck and shoulder strain.
1 Slipped and fell on icy sidewalk; contusion lower back.
1 Struck elbow on rack while moving equipment; contusion left elbow.
1 Injured back while in cramped position; possible herniated disc.
1 Slipped on snow covered ice; contusion of head.
1 Fell on ice; injured hand & shoulder.
1 Slipped on wet floor; injured left side.
1 Slipped on ice; contusion to ribs.
1 Struck elbow against file cabinet.
1 Digestive disorder after eating cafeteria food.
1 Pushing a loaded pallet; low back strain.
1 Cleaning workplace; steel plate fell on foot.

LOST TIME INJURY/ILLNESS BRIEFS
1982
CONTRACTOR EMPLOYEES

DAYS	DESCRIPTION OF MISHAP
195	Preparing to wash hands, slipped in water on floor, fell; back injury.
158	Attempting to secure ladder to pole, ladder swung knocking employee into steel spike; fractured shoulder, required surgery.
126	Slipped on spilled mayonnaise; twisted knee and pulled thigh muscle to lower back.
86	Chair rolled out from under employee; injured back.
79	Practicing descent and landing as part of "ALERT" team training, twisted ankle on landing; fractured left leg.
78	Erecting heavy duty storage racks, cross member slipped off forklift, swung 4 feet to ground; broken ribs.
78	Employee fell and hit head; bruised scalp.
77	Bending over picking up material from pallet; pulled muscle in middle back, acute back sprain.
76	Fell on wet pavement in parking lot; fractured left radius and ulna.
76	Moving file cabinets; back strain.
73	Cleaning engine on crane while standing on crane tire; melting oil and grease splattered onto tire, employee slipped and fell approximately 5 ft; pinched nerves in back.
72	Transformer fire; first and second degree burns face, chest, and head.
63	Slipped on wet surface area; strained lower back.
61	Moving tape reels; strained chest and abdomen muscles.
58	Replacing tractor tire, during inflation tire seal ring broke, tire exploded; fractured left arm.
56	Slipped and fell on wet floor; hurt back.
55	Removing pipe from ceiling area, ladder slipped, employee fell approximately 15 feet; chipped teeth and bruised arm.
54	Normal lifting; acute back strain.
53	Descending step ladder; injured back.
50	Moving tape boxes; hernia.
48	Muscles strain; lower back.
48	Installing conduit in attic while in crouched position; pinched nerves in back.
44	Cleared jam in stitcher; smashed finger.
40	Injured back while moving a K-bottle.
38	Lifted tool box; right inquinal hernia.
38	Loosening bolts; pulled muscle in lower back.
38	Opening window, hand slipped and went through glass; lacerated right wrist.
38	Machinist lifted lathe tool box; right inguinal hernia.

37 Putty knife in eye; lacerated right eye.

36 Slipped on ice; pulled back muscle.

34 Slipped on second step of bus, tried to catch self with hand; broken wrist.

34 Wringing out mop; fingers popped.

34 Sanding aluminum panel, thumb caught between aluminum and sanding disk; torn thumbnail and compound fracture of thumb.

32 Attempting to stop piece of machinery from falling while being moved; pinched left little finger.

31 Jumper-starting forklift, forklift rolled back against another forklift, caught leg between battery cover plate and second forklift; compound fracture.

31 Lifted test support device; mild strain in lower back.

31 Wheeling load of concrete; pulled muscle lower back.

31 Materials Test Technician lifted test device; severely strained back.

30 Off-loading "breadracks", racks slipped, fell on foot; 3 broken bones.

29 Forming aluminum strip by hand in machinist's vise; pain in left groin.

29 Fell over aircraft towbar; contusion of thorax.

27 Table top fell on foot; lacerations of left foot.

26 Employee cut through electrical cord; shock.

25 Tripped on under-floor electric conduit access cover; fractured left kneecap.

25 Lifted paint bucket; hernia.

23 Hand caught between controls and door; left thumb broken, nail torn loose.

22 Lifted box off handcart; sprained lower back.

21 Opened trailer door and fell out; injured left knee.

21 Wind blew hangar personnel door closed on hand; fracture.

21 Moving furniture; acute lower back strain.

21 Drilling on creosote timbers; injured left thumb.

20 Pulling staples from silk screening frame all day; hurt right shoulder.

18 Attempting to adjust elec. exten. cord, raised and bumped top head on support cross beam; contused scalp.

18 Riding in back of pickup truck, exited as truck momentarily shifted in reverse, truck backed into employee's knee; contusion.

18 Walking across warehouse; fell and fractured right shoulder.

18 Normal furniture movement; acute lower back strain.

17 Tractor wheel went over foot; bruised right foot and calf.

16 Lifted box of six-ply paper; back and leg pain.

16 Bent over to open desk drawer; pulled lower back muscle.

16 Pulling on pipe wrench; pulled muscle lower back.

15 Tending tow line hooked to parachute, lost grip, rope hit right ankle and knee; contusions.

15 Operating lathe; severed thumb and index finger.

15 Moving parts cabinet; injured back.

15	Cutting tree limb with chainsaw; lacerated left foot.
15	Pulling wire out of 2-in. conduit; conduit pulled from wall, struck employee in mouth causing fall from ladder; lacerations to lip and elbow, concussion.
14	Stepped out of truck cab; twisted right knee.
14	Amputated nail and tip of left middle finger in safe door.
14	Replacing engine cowling of forklift; smashed left little finger.
13	Adjustable stool collapsed, right foot hit foot rest; injured ankle.
13	Walking around corner, slipped; injured right ankle and knee.
13	Spilled hot water on legs; burned left thigh and scrotal.
11	Pushed on center part of upper tail cone to tighten bracket; pain in neck.
11	Walking on wet floor, slipped and fell; bruised head, neck, left elbow.
11	Pulling tub of mail; pulled muscle lower back.
11	Normal lifting; sprained shoulder.
10	Slipped on button on floor; shoulder sprain, fracture right arm.
10	Cleaning computer room area, stepped through opening in flooring; sprained ankle and back.
10	Crating equipment; hit left thumb with hammer.
9	Descending stairs carrying printouts, slipped down stairs; sprained back.
9	Carrying valve covers to basement; twisted right wrist.
9	Unloading baggage from car; severe lower back pain.
9	Hand moving a large breaker; right inguinal hernia.
9	Moving file cabinet; wrenched back.
9	Lifting compressor; strained back.
9	Bent over to pick up trash; injured back.
9	Lifted boxes; pulled right side of back.
9	Reaction to insect sting.
9	Stung by insect; severe reaction.
8	Inhaled tear gas while participating in "ALERT" training program.
8	Lifting 15/20 lb. box into van; pain in back.
8	Picking up material from floor, started having severe back pain; lumbar sprain.
8	Turned, pain in left knee while walking across parking lot; swollen left knee.
8	Air compressor electrical short; flash burn of right arm.
8	Normal lifting activities; sprained left shoulder and neck.
8	Loading abrasive compound hopper; back injury.
7	Moving light aluminum deck grating, lifted and apparently turned and twisted; back strain.
7	During hazardous operation TPS-083 when disconnect took place N_2O_4 vapors escaped into atmosphere, exposed 4 security personnel to toxic vapors.
7	Moving material; injured back.
7	Hoisting 25 lb. tool bag by rope; sharp pain lower back.

7 Slipped when walking through water, fell; injured back.

7 Walking across aisle, tripped on sling; fractured left wrist, contused right thumb and right knee.

7 Turned while walking; pain in hip and lower back.

7 Bending over to pick up vehicle tire; strained lower back.

6 Working on GAP fillers applying coating containing butyl alcohol, burning in lungs and throat; sensitivity to chemical.

6 Walking outside on pavement, stepped in hole; pain lower back.

6 Picked up pail, dropped can of aerosol black stencil ink, it exploded; chemical burns of face, eyes, and hands.

6 Trash bag tore, employee lifted barrel to empty it; hurt back.

6 Fell while exiting tailer; wrenched shoulder, arm, and neck.

6 Struck on head by equipment rack.

6 Working on air handler; cornea abrasion and chemical irritation in eye.

6 Entering snack bar area, caught foot in door; torn ligament.

6 Disconnecting air line to sandblaster; air line exploded; ruptured blood vessels in right hand.

5 Exiting POV; tripped on curb and fell.

5 Replacing brake diaphram on bus, air pressure blew clamps off striking bridge of nose; fracture.

5 Lifting boxes in tight area, twisting to place in another location; back sprain.

5 Drank from can of cola which tasted and smelled like petroleum.

5 Struck block of 3x12x24 wood, it fell, struck big toe on left foot; fractured toe.

5 Mopping floor; sharp pain in back.

5 Pushing Gov't. van; left front wheel ran over foot.

5 Driver changed lanes, car in lane, mishap; unknown injuries.

5 Caught right eye on corner computer paper; abrasion right eye.

5 Lifting computer tab runs; sprained lower back.

5 Assisting in moving desk, pinned hand against rail of cart while lowering it.

5 Drilling inside aft skirt, air motor hit mouth and chin.

5 Lifting box of computer forms; strained back.

5 Lifting tapes; strained back.

5 Tripped over pallets; contusion of knees and hands.

5 Repositioning engine afterburner on workstand; injured back.

5 Stepped of curb; strained ankle.

5 Pinched nerve in neck and shoulders.

5 Lifting separator panel; strained back.

4 Lifting boxes; sharp, low back pain.

4 Visitor escort going upstairs, slipped on banana peel dropped by visitor.

4 Moving equipment; strained back.

4 Lifted bookcase; injured back.

4 Rock flew up and hit eye; possible cornea injury.

4 Stumbled over wooden stake; sprained right ankle.

4 Lifted manifold; pulled muscle in rib cage.

4 Removing survival kit from cockpit; injured lower right side.

4 Exposed to carbon monoxide.

4 Caught between two map files; bruised ribs.

4 Pulling wire through conduit in trench, bar slipped and struck employee in back; bruise and soreness in back.

4 Slipped through section of grating; contusion of right lower leg.

4 Carrying box down stairwell backwards, slipped and fell; muscle strain and bruised elbow.

4 Lifting pan of hot grease, grease spilled; burned left arm.

4 Using wrench; strained muscle in left scapula.

4 Received abrasion and bruise to finger while moving cross-ties.

4 Working in cramped position to install valve; injured back. .

4 Sniffed Industrial Grade Ammonia in bottle.

4 Electrician's helper fell from ladder; strained back.

4 Warehouse employee fell from storage platform; injured elbow and back.

4 Mechanical Technician fell through section of grating; badly bruised leg.

3 Removing sheaves and large pins from TSM; pain in lower back.

3 Slipped off wooden walkway; sprained ankle.

3 Lifted box, paused to look left to be sure path clear; neck muscle sprain.

3 Lifting box of shredded material from truck; strained lower back.

3 Lifted strut handling kit from lower shelf; pain in lower back.

3 Putting plastic over caged area using lengths of dexion as support members. Lifting four 12 foot lengths of dexion; pain in lower back.

3 Carrying sheet of documentation and fell down three steps, landed on left leg; leg injury.

3 Draining tank prior to repair broken valve, pump hose came off sprayed caustic on face; chemical burn to face.

3 Car collided with POV then hit light pole, POV collided with second GSA vehicle; POV driver sustained multiple lacerations.

3 Going down stairs, slid down stairs to bottom; injured back.

3 Running up stairs, twisted wrong way; pain in lower back.

3 Attempting access inside aft skirt, bumped head on ladder inside skirt; fell to knees.

3 Getting down from platform over thrusters on orbiter, bracket shifted, lost control of descent; injured thigh.

3 Descending stairs carrying tool bag, slipped; twisted lower back.

3 Installing insulation from ladder; twisted leg.

3 Foreign object in left eye.

3 Fell to ground while pushing cart; lost consciousness.

3 Lifted 50 pound boxes from floor to roll cart; pulled muscle in back.

3 Lifted computer terminal; strained muscle in back.

3 Descending stairs; slipped and fell.

3 Coat swung back and hit eye.

3	Walking down stairs; twisted ankle.
3	Fell out of truck; cut back of head.
3	Testing pump in valve lab; closed valve, dome regulator exploded; fragment of regulator struck and injured stomach area.
3	Lifting and loading boxes (approx. 40-lbs each); sprained right shoulder.
3	Pulling pump from hole; strained back.
3	Trying to prevent microfiche cabinet from tipping; strained lower abdominal area.
3	Picked up mail tray; injured back.
2	Standing on plastic crate, filling juice machine, crate slipped; fell.
2	Placing tray of food on shelf, shelf fell; struck right forearm.
2	Carrying box of paper across room, tripped over mat; twisted right ankle.
2	Engaged in "ALERT" team training, assisting in lifting individual, bumped elbow against building; injured elbow.
2	Emptying scrap cork trash bin into dumpster, bin dropped, attempted to catch bin; thrown forward and down.
2	Lifting leg in high bucket, leaned hard to unlock door; contused chest.
2	Lifting heavy equipment, it slipped, tried to catch it; sprained back.
2	Lost footing on stairway, twisted ankle; fractured right ankle.
2	Smashed finger in closing door; bruised thumb.
2	Disassembling a compressor valve when pain was felt in right elbow; tendonitis in right elbow.
2	Slipped off curb; twisted ankle.
2	Removing hose coupling in trench; strained back.
2	Muscle strain lower back.
2	Going through door, door opened from other side; injured left hand, arm, and chest.
2	Lifted boxes; pulled muscles on left side.
2	Struck foot on computer; bruise.
2	Attempting to straighten course of push-type trash cart; strained back.
2	Slipped and hit head; mild head concussion.
2	Slipped and fell; bruised left forehead and knee.
2	Normal lifting; acute lumbar musculoskeletal strain.
2	Overpressure of air conditioner component; laceration of both hands.
2	Pinched hand between drive motor and wall; sprained left wrist.
2	Loosening bolts; sprained inter-coastal muscle.
2	Climbing down scaffold; twisted knee.
2	Finger struck metal cabinet; possible dislocation little finger right hand.
2	Wind blew door closed on hand; lacerated fingers right hand.
2	Heliarc welding flash; flash burns both eyes.
1	Squatting to check equipment beneath bench of ambulance, raised bench seat; pulled back muscles.
1	Walked around desk, tripped over phone cord, fell to floor; injured left hip.
1	Cleaning with MEK; splashed some in right eye.

1 Stocking walk-in refrigerator; hit left lower shin on wooden box inside refrigerator.

1 Removed empty 3 gal. jug, replaced with full jug; back injury.

1 Slipped on wet floor in front of ice dispenser, fell; contused chest.

1 Cutting box with razor knife, slipped; cut left wrist.

1 Descending ladder from OMS POD; twisted ankle.

1 Putting tools away, tool fell out of hands; contusion left shin.

1 Tripped over kellum grip; landed on left arm, left hand, and shoulder.

1 Auto accident in Gov't. vehicle; scalp and chin lacerations.

1 Looking for cable in manhole, bumped head on cable tray; hematoma on scalp.

1 Performing work hanging tags on stainless steel flex hoses, wire loop on tag slipped from fingers, sprung around; scratched left eye.

1 Descending aft skirt, jumped last foot to ground; pain lower back.

1 Auto stopped at intersection, hit from behind on left rear fender by auto; hit head on widshield, possible whiplash.

1 Going out door, hit left hand on edge of door; fractured hand.

1 Stepped between metal and ladder on ground; sprained ankle.

1 Working in VAB, coming down stairs in Tower E, slipped on step; injured right side.

1 Purging files, lifted box weighing approx. 15 lbs.; back sprain.

1 Sitting in chair, bent over to pick up paper; lower back pain.

1 Solder exploded, struck face and eyes; multiple burns of face/eyes.

1 Checking communications bridges in VAB, struck head on ladder support; head contusion.

1 Slipped on wet floor, tried to balance with arm; dislocated left shoulder.

1 Picked up O_2 cylinder; injured back.

1 Walking down stairs, slipped and turned ankle; sprained ankle.

1 Trash can slipped and hit hand while emptying trash; fractured hand.

1 Transferring portable gasoline pump from cart to storage shed; strained lower abdominal muscles.

1 Stepped into a hole in pavement; sprained left ankle.

1 Caught back of foot while wheeling welding machine; bruised tendon of left foot.

1 Loading computer paper onto cart; twisted left knee.

1 While weighing power supply, dropped it on right big toe; bruised and swollen right big toe.

1 Loading sand bags; pulled muscle in back.

1 Piece of debris in eye.

1 Slicing vegatables; lacerated right forearm.

1 Dust in eye.

1 Employee involved in automobile accident; sore neck and back.

1 Handling electrical cables on reels; lacerated and fractured middle finger left hand.

1	Fell on steps outside building; sprained and bruised both ankles.
1	Adjusting audio level on amplifier board, capacitor blew out; foreign residue under glasses and in right eye.
1	Stepped across open floor panel; twisted back.
1	Stripping and waxing floor; pulled knee muscles.
1	Cutting metal, got shavings in eye.
1	Tripped on floor mat; hit side of face on door frame.
1	Climbing ladder; injured shoulder.
1	Slipped on step; bruised shin and elbow.
1	Injured knee.
1	Foreign body in right eye.
1	Lifting cabinet; injured back.
1	Raising and lowering computer riser; sprained left wrist.
1	Moving boxes; pulled back muscles.
1	Stepped on nail.
1	Irritated right eye with flying glass.
1	Lowering bookcase to floor; sharp pain lower back.
1	Slicing tomatoes in cafeteria kitchen; cut finger.
1	Entering grease pit, slipped on step; sprained right ankle.
1	Conduit fell on foot; contusion left foot.
1	Metal plate fell on foot; fracture left great toe.
1	Lifting carton; low back strain.
1	Moving fume hood; strained back muscle.
1	Moving typewriter; sprained right wrist.
1	Caught hand between pipes; contusion right hand.
1	Aligning motor/pump assembly, rag hung up on coupling's woodruff key; amputated end of right middle finger.
1	Normal lifting; pulled muscle right shoulder.
1	Foreign body entered eye while working in data buoy.
1	Warehouse employee got piece of debris in eye.
1	Engineer got dust in eyes in remote test site area.
1	Cafeteria employee lacerated right forearm while slicing vegetables.
1	Loading sand bags; pulled muscle in back.
?	Thumb caught between wrench and casting; nail lost.
?	Slipped in puddle of water; chest pains.
?	Magnetic tapes fell on back; contusions to thorax lumbar region.
?	Cut finger while using slicer; sutures required.
?	Struck thumb with hammer; nail drilled to relieve pressure.
?	Lacerated finger while using a knife; sutures required.
?	Impaled hand on steel rod.
?	Magnetic tape fell on big toe; fracture.

? Hand caught between table and rack; contusion.
? Thumb caught in closing door; fracture.
? Jammed hand against forklift controls; fracture.
? Hand caught between closing elevator doors; sutures.
? Irritation to eyes while landscaping; conjunctivitis.
? Foot caught between skids in warehouse; torn ligaments.
? Lost balance and slid into cabinet; sutures.
? Tripped over beam while carrying materials; sutures.
? Received electrical shock from slicer in cafeteria.
? Received electrical shock while assisting another who was shocked.
? Caught finger in desk drawer; fracture.
? Cut hand while working on collimation tower; sutures.
? Sawdust in eye; opthamologist removed it.
? Lumbar strain after lifting; herniated disc.
? While cleaning tables, slipped and fell; contusions.
? Hit on head by ceiling tiles; contusions.
? Lacerated arm with piece of metal; sutures, torn ligaments.
? Foreign body in eye; opthamologist removed it.
? Foreign body in eye; severe conjunctivitis.
? Cut thigh with exacto knife; sutures required.

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